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Broadwater-  
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Dam emergency  
action plan

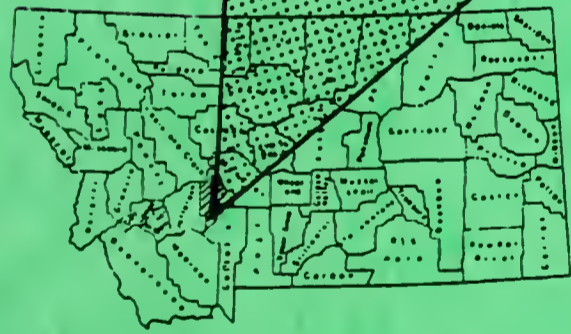
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# BROADWATER- MISSOURI (TOSTON) DAM EMERGENCY PLAN

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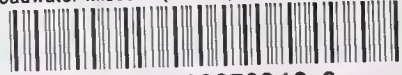
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BROADWATER-MISSOURI (TOSTON) DAM

EMERGENCY ACTION PLAN

Broadwater-Missouri (Toston) Dam  
FERC. Project No. 2853

Engineering Bureau  
Water Resources Division  
Montana Department of Natural Resources  
and Conservation  
1520 East Sixth Avenue  
Helena, Montana 59620-2301

Revised 6/1/91



Verification:

STATE OF [ Montana ]

County of [ Lewis & Clark ] ss:

The undersigned, being duly sworn, states that (he, she) has read the following document and knows the contents of it, and that all of the statements contained in that document are true and correct, to the best of (his, her) knowledge and belief.

Richard L. Bondy  
Name of person signing  
Chief, Engineering Bureau  
Title

STATE OF MONTANA )

County of Lewis & Clark )

On this 10th day of June, 1991, before me, a Notary Public for the State of Montana, personally appeared Richard L. Bondy, known to me to be the person whose name is subscribed to the within instrument, and acknowledged to me that (he, ~~she~~) executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal the day and year first above written.

John Kim  
Notary Public for the State of  
Montana NOTARY PUBLIC for the State of Montana  
Residing at \_\_\_\_\_ Residing at Helena, Montana  
My commission expires August 1, 1992



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# DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION



STAN STEPHENS, GOVERNOR

LEE METCALF BUILDING  
1520 EAST SIXTH AVENUE


## STATE OF MONTANA

DIRECTOR'S OFFICE (406) 444-6699  
TELEFAX NUMBER (406) 444-6721

HELENA, MONTANA 59620-2301

### MEMORANDUM

To: State Library

From: Art Taylor   
Dam Safety Engineer

Date: July 3, 1991

Re: Broadwater-Missouri EAP Update

Attached is the revised version of the Broadwater-Missouri (Toston) Dam EAP. Please discard the previous copies that you have and replace them with this version (revised 6/1/91).

The previous versions that you have in file are now out of date and obsolete, and contain inaccurate information.

If you have any questions, please call me at 444-6646.



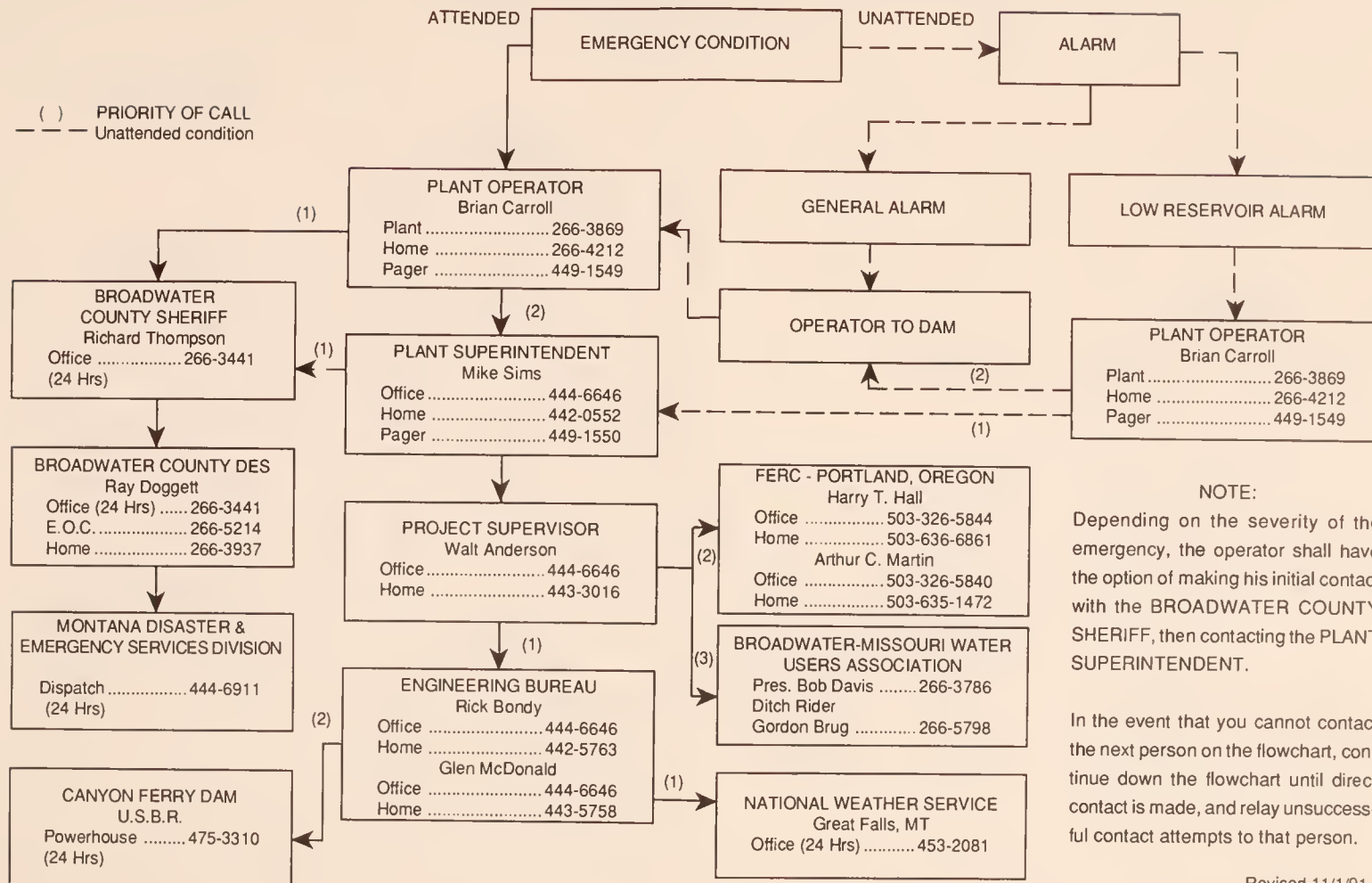
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# I. NOTIFICATION FLOWCHARTS

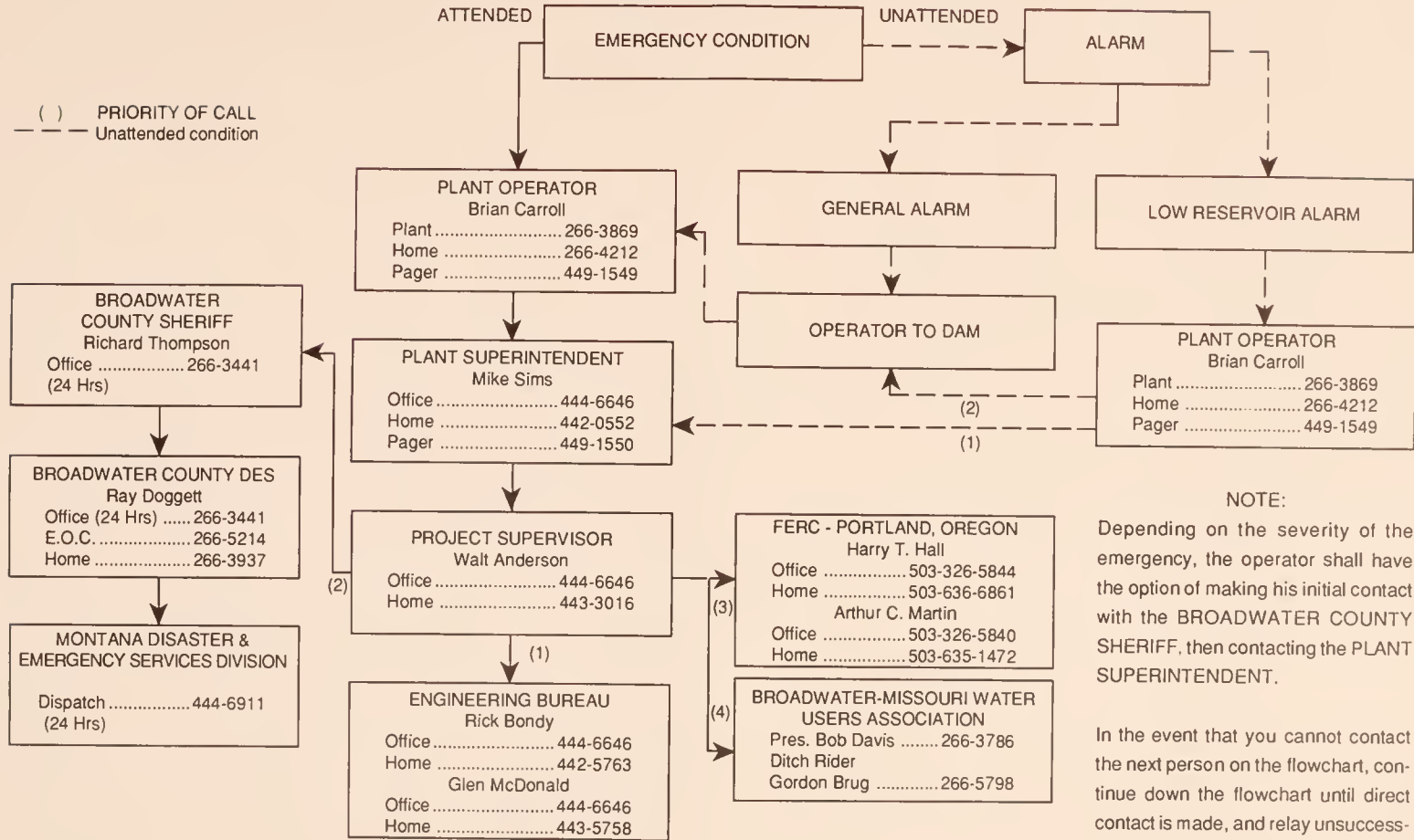
## A. FAILURE IS IMMINENT OR HAS OCCURRED

### NOTIFICATION FLOWCHART BROADWATER-MISSOURI DAM





# **B. POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING NOTIFICATION FLOWCHART BROADWATER-MISSOURI DAM**



## **NOTE:**

Depending on the severity of the emergency, the operator shall have the option of making his initial contact with the BROADWATER COUNTY SHERIFF, then contacting the PLANT SUPERINTENDENT.

In the event that you cannot contact the next person on the flowchart, continue down the flowchart until direct contact is made, and relay unsuccessful contact attempts to that person.



## II. General Responsibilities Under the Emergency Action Plan

### A. Purpose

This Emergency Action Plan (EAP) has been prepared in accordance with the requirements of the Federal Energy Regulatory Commission (FERC) Order Number 122 issued January 21, 1981 and revised in accordance with the provisions of Section 12.22 (a)(1), on April 5, 1985 (issued on February 22, 1988 with addendum issued September 9, 1988). It is submitted by the Montana Department of Natural Resources and Conservation (DNRC), Water Resources Division, Engineering Bureau, as Licensee for the Broadwater Power Project on the Missouri River, which is FERC Licensed Project No. 2853.

The purpose of this EAP is to provide maximum early warning to all persons involved in the unlikely event of failure (catastrophic or otherwise) of any project structure at the Broadwater Power Project. In addition to providing maximum early warning, the objective is to minimize danger to all people or property downstream.

Through modeling different failure modes and the resultant breach hydrographs, inundation zones have been developed and are shown on the inundation maps included in Appendix C. The inundation boundaries help identify residential, commercial, and recreational areas that would be at risk. Notification flowcharts were developed to facilitate evacuation and warnings at potentially affected areas by various public agencies and authorities.

The information contained in this plan is not intended to reflect in any way upon the actual integrity of the Broadwater Dam.

### B. Notification Plan

The notification flowcharts in Section I identify the agencies and people to be contacted during an actual or developing dam failure.

The notification procedure to implement at Broadwater Dam is dependent upon the following variables: the rate of dam failure (failure scenario), and whether the dam is attended or unattended.

The two dam failure scenarios for the Broadwater Dam are: A) failure is imminent or has occurred, and B) potentially hazardous situation is developing. When a "failure is imminent or has occurred" condition exists at Broadwater Dam, then Flowchart A is implemented. However, when the Broadwater Dam has a "potentially hazardous situation is developing" scenario, then Flowchart B is implemented. Identifying the type of failure scenario existing at Broadwater Dam allows one to initiate the appropriate notification flowchart.

The notification procedures are also influenced by whether the Broadwater Dam is attended or unattended during a dam failure. When the dam is unattended, generally, the Plant Operator or the Plant Superintendent is the first one alerted of a potential problem by the automatic telephone dialing system at the plant. When the dam is attended, the Plant Operator is the first one alerted of a potential problem. Therefore, the notification procedure is normally initiated by the Plant Operator.

The Plant Operator's notification responsibility for the Broadwater Dam is outlined below.

1. Notification Responsibilities

- a. Attended

If a "failure is imminent or has occurred", and the control room is attended, then the Plant Operator's first responsibility will be to notify the Broadwater County Sheriff. The Plant Operator shall then notify the Plant Superintendent by telephone. The Plant Superintendent's primary responsibility, upon receiving

notification from the Plant Operator, is to notify the Project Supervisor.

If you cannot reach the person that is next on the call down list, then you must assume their duties and responsibilities.

Under this failure scenario the Plant Superintendent will advise the Project Supervisor that a breach floodwave is approaching Toston and Townsend and to take appropriate action.

If a "potentially hazardous situation is developing" and the control room is attended, then the Plant Operator's first responsibility is to notify the Plant Superintendent. The Plant Superintendent's primary responsibility, upon receiving notification from the Plant Operator, is to notify the Project Supervisor. The Project Supervisor will first notify the Engineering Bureau Chief and second the Broadwater County Sheriff if the developing conditions make the notification of the sheriff necessary.

b. Unattended

When the control room is unattended, then the Plant Operator may be alerted of a problem by an alarm. The Plant Operator will be either the Plant Operator or the Plant Superintendent depending upon who is on call. The two types of alarms that signal a warning to the Plant Operator are the general plant shutdown alarm and the low reservoir level alarm. The responsibilities of the Plant Operator for the two alarm conditions are outlined below.

When the Plant Operator is on vacation or leave, then the Plant Superintendent assumes the Plant Operator's duties, as well as his/her own duties. When the Plant Superintendent is on vacation or leave, then the Project Supervisor assumes the Plant Superintendent's duties, as well as his/her own duties. When the Project Supervisor is on vacation or leave, then the Plant Superintendent assumes the Project Supervisor's duties, as well as his/her own duties.

When a general plant shutdown alarm occurs then the Plant Operator's normal responsibility is to travel to the project and investigate the cause of the alarm.

If, during the investigation the Plant Operator determines that a "failure is imminent or has occurred" condition exists, his/her first responsibility is to call the Broadwater County Sheriff and other personnel as identified on Flowchart A.

When a low reservoir level alarm sounds, then the Plant Operator is required to call the Plant Superintendent first and then travel to the dam and verify its condition, by visually checking the condition at the plant and verifying headwater and tailwater elevations by the SCADA station. Once it's been determined that it's not a false alarm, and a "failure is imminent or has occurred" condition exists, the Plant Operator's primary responsibility is to notify the Broadwater County Sheriff and other personnel identified in Flowchart A. In the meantime, the Plant Superintendent will travel to the Department office building and monitor headwater and tailwater conditions. If the Plant Superintendent concludes a "failure is imminent or has occurred"

condition exists, he/she must call the Broadwater County Sheriff.

The Plant Superintendent shall also notify the Project Supervisor that a "failure is imminent or has occurred" condition exists at the Broadwater Dam and they should take appropriate action.

2. Communication Examples (attended or unattended)

In times of an emergency, clear and concise exchange of information is essential. The Plant Operator when making the call to the Broadwater County Sheriff for a "failure is imminent or has occurred" scenario, shall include the following points:

- Caller's name and position
- Caller's location
- Brief description of situation
- The time of situation
- Intended follow-up actions
- Appropriate Notification Flowchart to initiate

IMPORTANT - ASK THE PERSON RECEIVING YOUR MESSAGE TO REPEAT IT BACK TO YOU SO THAT YOU WILL KNOW THAT THEY RECEIVED THE CORRECT MESSAGE AND UNDERSTAND HOW THEY ARE TO PROCEED.

A typical communication from a Plant Operator to the Broadwater County Sheriff under "failure is imminent or has occurred" condition may be as follows: "This is John Doe, operator at Broadwater Dam. Spillway Bays #6 & 7 failed between 11:45 a.m. and noon. The breach is approximately 100 feet wide and 40 feet deep. The Missouri River flow at the time of failure was 50,000

cfs, therefore initiate Notification Flowchart A. I am evacuating the site."

The Plant Operator when making the notification call to the Plant Superintendent for a "potentially hazardous situation is developing" condition shall include the following points:

- Caller's name and position
- Caller's location
- Brief description of the potential problem
- Brief assessment of the potential problem
- Intended follow-up actions
- Appropriate Notification Flowchart to initiate

A typical communication from the Plant Operator to the Plant Superintendent for a "potentially hazardous situation in developing" condition may be as follows: "This is John Doe, operator at Broadwater Dam. The middle portion of the dam has a severe leak. Approximate flow from the leak is 50 cfs. I am requesting you to initiate notification procedures for a "potentially hazardous situation is developing" condition. Flows in the Missouri River are about 6,000 cfs, therefore initiate Notification Flowchart B. I will stay on site and monitor the situation."

The Plant Superintendent will report a "potentially hazardous situation is developing" condition to the Project Supervisor. The Project Supervisor will contact the Engineering Bureau Chief and the Broadwater County Sheriff if the condition warrants. If the Engineering Bureau Chief is contacted, he will decide if other Engineering Bureau personnel will be contacted for assistance. The Engineering Bureau will discuss possible

solutions to the problem. These steps will be performed in order to provide assistance to the Plant Operator. However, the Plant Operator monitoring the problem is at liberty to initiate notification for a "failure is imminent or has occurred" condition whenever he/she feels it is warranted.

### C. Operations

Once the Plant Operator has completed the appropriate notification procedures, then he/she will implement the emergency operation procedures. The Plant Operator during the emergency condition will have to determine whether he/she can safely perform all steps in the operation procedures. Outlined below are the emergency operation procedures for both a "failure is imminent or has occurred" condition and a "potentially hazardous situation is developing" condition.

#### 1. Failure is imminent or has occurred.

- Step 1        Evacuate all station personnel
- Step 2        Alert all people immediately downstream to evacuate to higher ground (use bullhorn).
- Step 3        Alert all people located above the dam to exit the reservoir (use bullhorn).
- Step 4        Shut down the unit using emergency procedures.
- Step 5        Open all the spillway air bags.

**Note:**        Steps 4 and 5 should be initiated only if they can be performed safely.

#### 2. Potentially hazardous situation is developing. (The following steps shall be initiated only at the direction of the Plant Superintendent or the Project Supervisor).

- Step 1. Evacuate all nonessential personnel including boaters and fishermen.
- Step 2. Shut down unit using normal procedure.
- Step 3. Open the spillway air bags.

D. Notifying Local Officials

The Plant Superintendent shall notify the people identified below when implementing the notification procedures for a "failure is imminent or has occurred" condition. The Plant Superintendent shall communicate to responsible personnel the following points:

- Caller's name and title
- A warning that a dam failure has or is about to occur
- Evacuate all personnel to higher ground immediately

The Plant Superintendent shall notify the following agencies in the order listed:

1. Broadwater County Sheriff (unattended only)
2. Project Supervisor

Phone numbers and personnel for the above agencies are located in Flowchart A and Section III Notification Procedures, and Appendix G, Telephone Directory.

The Plant Operator shall be responsible for warning those recreating in the reservoir or just below the dam of a "failure is imminent or has occurred" condition. The Plant Operator when evacuating the site shall position himself along the road and use a bullhorn to warn recreationists. The warning must clearly express dam failure is imminent and evacuation from the Missouri River must begin immediately.

The Broadwater County Sheriff will coordinate evacuation, rescue and mitigation of all parties affected by a Broadwater Dam failure. The Broadwater County Sheriff is responsible for coordinating these activities within his jurisdiction. The responsibilities of the Broadwater County Sheriff in times of a dam failure are outlined in the "Emergency Operation Plan for Broadwater County and City of Townsend" in the section titled "Dam Failure/Flood, Contingency Plan."

After notifying the appropriate personnel, the Plant Operator is responsible for monitoring the situation. The monitoring process will include an evaluation to determine the condition's state as progressive or static. The Plant Operator will also evaluate whether any immediate action can be taken to mitigate the condition.

The Plant Operator will continuously maintain communication with the Plant Superintendent during the monitoring process. This monitoring and communication link will continue until the Plant Superintendent or the Project Supervisor direct changes to the procedure, or until conditions change such that the monitoring is no longer required.

#### E. Updating Local Officials

The Project Supervisor is required to notify the local agencies when initiating notification procedures for "failure is imminent or has occurred" condition. Local officials and the media will be updated by the Project Supervisor of changes in the condition of the dam.

The Project Supervisor has the responsibility of notifying local agencies of a "potentially hazardous situation is developing" condition. The Project Supervisor in turn shall notify and update local agencies of conditions at the project site using Flowchart B and Section III Notification Procedures.

F. EAP Coordinator

The EAP Coordinator is Walt Anderson, Project Supervisor. Some activities Mr. Anderson will coordinate are revisions to the EAP, training seminars for plant operators, and annual testing of the EAP. Mr. Anderson's office address is: 1520 East 6th Ave., Helena, Montana 59620-2301 and he can be reached at (406) 444-6646.

III. Notification Procedures

A. Failure is imminent or has occurred - Attended Condition.

Plant Operator's notification responsibilities for a "failure is imminent or has occurred" condition.

1. Notify the Broadwater County Sheriff and advise him/her of the situation by telephone:

Sheriff Dispatch Center 266-3441 (24 hrs)

2. Notify the Plant Superintendent and advise him/her of the situation by telephone:

Plant Superintendent 449-1550 pager (24 hrs)

Mike Sims 444-6646 office

442-0552 home

Note: If the Plant Operator cannot notify the Plant Superintendent, then the Plant Operator is responsible for the Plant Superintendent's notification calls in addition to notifying people located near the project with a bullhorn.

Plant Superintendent's notification responsibilities for a "failure is imminent or has occurred" condition.

Notify the Project Supervisor and advise him/her of the situation by telephone:

Project Supervisor	Office	444-6646
Walt Anderson	Home	443-3016

The Project Supervisor's notification responsibilities for a "failure is imminent or has occurred" condition.

- |    |                                   |        |          |
|----|-----------------------------------|--------|----------|
| 1. | Engineering Bureau Chief          | Office | 444-6646 |
|    | Rick Bondy                        | Home   | 442-5763 |
|    | or                                |        |          |
|    | Project Rehabilitation Supervisor | Office | 444-6646 |
|    | Glen McDonald                     | Home   | 443-5758 |

- |    |                                      |                     |
|----|--------------------------------------|---------------------|
| 2. | Federal Energy Regulatory Commission |                     |
|    | Harry T. Hall                        | Off. 1-503-326-5844 |
|    |                                      | Res. 1-503-636-6861 |
|    | Arthur Martin                        | Off. 1-503-326-5840 |
|    |                                      | Res. 1-503-635-1472 |

3. Water Users Association
- |                          |          |
|--------------------------|----------|
| Bob Davis, President     | 266-3786 |
| Gordon Brug, Ditch Rider | 266-5798 |

The Broadwater County Sheriff's notification responsibilities for  
a "failure is imminent or has occurred" condition.

Broadwater County DES

Ray Doggett      Off.      266-3441 (24 hrs.)  
                          E.O.C.    266-5241  
                          Home     266-3937

Engineering Bureau Chief's notification responsibilities for a  
"failure is imminent or has occurred" condition, day or night.

1. Engineering Bureau Personnel (see telephone Directory in Appendix G)

and

Dam Safety Section	Office	444-6613
Mike Oelrich	Home	449-5668
Gary Fischer	Home	442-8818
Water Resources Division	Office	444-6601
Gary Fritz	Home	443-3631

2. National Weather Service 453-2081 (24 hrs)
3. Canyon Ferry Power Plant Operator 475-3310 (24 hrs)

B. Failure is imminent or has occurred - Unattended Condition.

When the dam is unattended, the Operating Personnel are warned of an emergency condition, either by a low reservoir level alarm or by a general plant shutdown alarm. The Plant Operator's response to the two alarm conditions is outlined below.

When the Plant Operator is on vacation or leave, then the Plant Superintendent assumes the Plant Operator's duties, as well as his/her own duties. When the Plant Superintendent is on vacation or leave, then the Project Supervisor assumes the Plant Superintendent's duties, as well as his/her own duties. When the Project Supervisor is on vacation or leave, then the Plant Superintendent assumes the Project Supervisor's duties, as well as his/her own duties.

When the Plant Operator receives a low reservoir level alarm, he/she shall:

1. Notify the Plant Superintendent  
Mike Sims 449-1550 pager (24 hrs)  
444-6646 office  
442-0552 home

and

2. Travel to the dam to verify its condition. If the Plant Operator upon arriving at the dam determines that a "failure is imminent or has occurred" condition exists, he/she shall call the Broadwater County Sheriff and initiate Flowchart A.

The Plant Superintendent shall verify the alarm condition by performing the following steps:

- Step 1) Check SCADA display screen for a significant rise in the tailwater over a brief time period.
- Step 2) Check SCADA display screen for a significant decrease in the headwater over a brief time period.

Once the verification steps have confirmed a significant rise in the tailwater accompanied with a drop in headwater, then the Plant Superintendent shall be responsible for initiating notification procedures for a "failure is imminent or has occurred" condition and notify:

1. The Broadwater County Sheriff and advise him/her of the situation by telephone:

Sheriff Dispatch Center 266-3441 (24 hrs)

2. The Project Supervisor and advise him/her of the situation by telephone:

Project Supervisor	Office	444-6646
Walt Anderson	Home	443-3016

When one of the Operating Personnel receives a general plant shutdown alarm, then he/she shall travel to the dam and investigate the cause. The time for the Plant Operator to arrive on site is twenty (20) to forty (40) minutes.

Once the Plant Operator is on site, the procedures for the attended condition shall be followed.

C. Potentially hazardous situation is developing - Attended Condition.

Plant Operator's notification responsibilities for a "potentially hazardous situation is developing" condition:

Notify Plant Superintendent and advise him/her of the situation:

Mike Sims, Plant Superintendent

Phone: Office        444-6646  
         Home        442-0552  
         Pager        449-1550 (24 hrs)

Plant Superintendent's notification responsibilities for a "potentially hazardous situation is developing" condition.

Notify Project Supervisor and advise him/her of the situation:

Walt Anderson, Broadwater Plant Supervisor

Phone: Office        444-6646  
         Home        443-3016

Note: The Project Supervisor will report the situation to Chief, Engineering Bureau. Depending upon the nature of the potentially hazardous situation, mitigation measures will be discussed with the Engineering Bureau before a specific course of action is chosen. If deemed necessary, the Project Supervisor will notify the following:

1. Engineering Bureau Chief

Rick Bondy                      Office 444-6646  
   Home    442-5763

or

Project Rehabilitation Supervisor

Glen McDonald                      Office 444-6646

Home      443-5758

2.      Broadwater County Sheriff      266-3441 (24 hrs)

3.      Federal Energy Regulatory Commission

         Harry T. Hall                      Off. 1-503-326-5844

            Res. 1-503-636-6861

         Arthur Martin                      Off. 1-503-326-5840

            Res. 1-503-635-1472

4.      Water Users

         Bob Davis, President              266-3786

         Gordon Brug, Ditch Rider      266-5798

D.      Potentially hazardous situation is developing - Unattended Condition.

When the dam is unattended, the Operating Personnel are warned of an emergency condition either by a low reservoir alarm or by a general plant shutdown alarm. The Plant Operator's response to the two alarm conditions is outlined below. When the Plant Operator is on vacation or leave, then the Plant Superintendent assumes the Plant Operator's duties, as well as his/her own duties. When the Plant Superintendent is on vacation or leave, then the Project Supervisor assumes the Plant Superintendent's duties, as well as his/her own duties. When the Project Supervisor is on vacation or leave, then the Plant Superintendent assumes the Project Supervisor's duties, as well as his/her own duties.

When the Plant Operator receives a low reservoir level alarm, he/she shall:

1.      Notify Plant Superintendent and advise him/her of the situation:

Mike Sims, Plant Superintendent

Phone: Office 444-6646

Home 442-0552

Pager 449-1550 (24 hrs)

2. Travel to the dam and investigate the alarm. If the Plant Operator upon arriving at the dam determines that a "potentially hazardous condition situation is developing" condition exists, he/she shall again notify the Plant Superintendent and initiate Flowchart B.

Plant Superintendent's notification responsibilities for a "potentially hazardous situation is developing" condition.

Upon receiving the first call from the Plant Operator that a low reservoir level alarm exists, the Plant Superintendent shall investigate the alarm condition by performing the following steps:

- Step 1) Check remote SCADA display screen for a significant rise in the tailwater over a brief time period.
- Step 2) Check remote SCADA display screen for a significant decrease in the headwater over a brief time period.

Once the investigation steps have confirmed that the headwater and tailwater levels are stable, then the Plant Superintendent shall wait for a second call from the Plant Operator who is enroute to the plant or already there and investigating the alarm. When the Plant Superintendent receives the second call from the Plant Operator and is notified that a "potentially hazardous situation is developing" condition exists, he/she shall notify the Project Supervisor and advise him/her of the situation by telephone:

Project Supervisor	Office	444-6646
Walt Anderson	Home	443-3016

When one of the Operating Personnel receives a general plant shutdown alarm, then he/she shall travel to the dam and investigate the cause. Once the Plant Operator is on site, the procedures for the attended condition shall be followed.

E. Posting of the notification flowchart and distribution of EAP.

Copies of the notification flowcharts for both "failure is imminent or has occurred" and "potentially hazardous situation is developing" scenarios shall be posted at the following locations:

1. Broadwater Power Project Control Room
2. Engineering Bureau Office - Helena (all engineers have a copy)
3. Plant Operator's Home
4. Broadwater County DES Coordinator - Townsend
5. Broadwater County Sheriff's Office - Townsend
6. Federal Energy Regulatory Commission - Portland Office
7. Broadwater-Missouri Water Users Association Directors
8. Department of Natural Resources and Conservation  
Library
9. State Library
10. State Disaster and Emergency Services - Helena
11. Ditch Rider
12. Montana Power Company in Butte

A copy of the complete up-to-date EAP will be distributed to each agency and individual identified in the notification plan in Section III. Each complete copy of the EAP distributed will include one spare copy of each notification flowchart for posting. The additional copies of the notification flowcharts shall be included at the end of the documentation section. Each plan holder will receive revisions to the plan as necessary. Additional copies of the most up-to-date notification flowcharts can be obtained by contacting the EAP Coordinator, Walt Anderson (406) 444-6646.

#### IV. Preventive Actions

##### A. General Provisions for Surveillance

The Broadwater Dam is monitored by a Plant Operator eight hours a day and by a Supervisory Control and Data Acquisition (SCADA) system twenty-four hours a day.

Surveillance of the dam will be performed principally by the Plant Operator. The Plant Operator will be the primary observer; other persons may report problems with the dam when they are in the area. The duties will include observation of dam safety related checklist items including seepage, cracks, settlement, debris, erosion, etc. The ditch rider is normally at the dam once a day during the irrigation season, but not year-round, and may observe and report problems.

The Engineering Bureau makes yearly physical inspections of the dam. The dam is equipped with post tensioning anchor system monitors, piezometers adjacent to the powerhouse, and a headwater/tailwater level monitoring system. An inspection report is written and compared to previous inspection reports.

When the project is unattended, the Supervisory Control and Data Acquisition (SCADA) system will report power plant alarm conditions to the Plant Operator at a remote location. A dam failure would be detected by headwater/tailwater level monitor alarms. A telephone dialer would notify the Plant Operating Personnel of an alarm condition. The Plant Operator will travel to the dam and visually check its condition. Personnel living in Helena can check the condition of the dam at the SCADA remote terminal in the Department's office. The Broadwater County Sheriff's Office will be contacted either from the dam or from the Department offices in Helena, and informed of the condition of the dam.

The Plant Operator is trained annually on inspection procedures. The Plant Operator learns to identify any unusual sound, smell, vibration or heat source around the plant. The Plant Operator is also trained to monitor the general condition of the project structures and station equipment. The various items that are inspected daily by the Plant Operator are listed below:

Daily Inspection:

1. Substation
  - a. Make a general switchyard inspection.
  - b. Make a general transformer and breaker inspection.
2. Dam waterways and spillway gates
  - a. Inspect all spillway gates.
  - b. Inspect piers, right and left abutments for leaks or cracks.
  - c. Inspect trash rack at turbine intake.
  - d. Check headwater staff and compare with plant meters.
  - e. Check for icing conditions of all waterways upstream and downstream.
  - f. Check all boater safety booms and associated safety equipment.
3. Powerhouse
  - a. Make a general inspection of all components.
  - b. Check SCADA for alarms and investigate.
  - c. Check and record critical temperatures, water levels, and outputs from SCADA.
  - d. Check all fluid levels, flow status, and pressure.
  - e. Check all pumps, motors, pressure vessels and compressors.
  - f. Check for leaks and general condition of all: lubricating oil system, hydraulic system, cooling water system, and seal water system.

- g. Check battery room charger and batteries.
- h. Check general operating condition of the automatic upstream head level control.

B. Surveillance at Remotely Controlled or Unattended Dams

The Broadwater powerhouse and appurtenances are continuously monitored by a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system consists of the following components: transducers, remote terminal unit (RTU), communications input/output controller, computer and monitor. The SCADA system transducers are sensors that signal an alarm condition. The two alarms that may be sounded are:

1. General Plant Shutdown Alarm

The SCADA monitors the status of a variety of systems located in the Broadwater powerhouse. Some examples of alarm points being monitored for generation systems are: over current or ground, generator over speed, lubricating oil reservoir levels, bearing temperatures and stator temperatures. When normal operating conditions are exceeded for these and other systems, then a general plant shutdown alarm sounds.

When a general plant shutdown alarm sounds, the specific alarm point's status is displayed on the SCADA alarm summary located in the Broadwater Control Room and also the Department Office building in Helena. If the control room is attended, then the **Plant Operator** will be required to identify, inspect and mitigate the problem. If the **Plant Operator** encounters difficulty in clearing the alarm, he/she will notify the **Plant Superintendent**. In addition, the general plant shutdown alarm warning is printed to a data logger with the date and time of occurrence.

## 2. Low Reservoir Level Alarm

Water level transducers are installed in the headwater and tailwater at Broadwater to monitor water surface elevations. The level transducers are linked into the SCADA system through the RTU located in the Broadwater powerhouse and the Helena office to provide continuous monitoring of actual levels.

When a signal is transmitted from the reservoir level transducer, which is below a given set point, a low reservoir level alarm is annunciated by an automated phone calling system. Plant Operating Personnel are notified of the low level and must travel to the dam to investigate.

When a low reservoir level alarm sounds, the Plant Operator shall be required to verify whether a dam failure has occurred. Confirmation of a dam failure is made by visually inspecting the dam and appurtenant structures at Broadwater. This will allow the Plant Operator to determine whether a false alarm condition exists or whether a dam failure has occurred.

A quality control program is maintained to insure the integrity of the SCADA system at Broadwater Dam. This program tests and inspects all transducers, meters, relays, annunciator, and panel alarms annually at the Broadwater plant. After testing the system, all nonfunctional or worn components are replaced. Upon installation of new components, a test is run to assure all systems are functional.

## C. Response During Periods of Darkness

No additional actions can be taken to respond to an emergency situation or failure at the dam during darkness, other than

those taken during daylight hours. The response time will be longer because of the additional time and travel involved in verification, notification and response to an emergency in off hours.

The instructions to the Operating Personnel are applicable to hours of both daylight and darkness. Procedures for contacting proper personnel and officials are applicable to hours of both daylight and darkness. Until reports can be verified or proven to be false, a warning shall be given in the interest of public safety. There is a telephone at the dam (266-3869). There are two sources of AC power and an inverter DC backup system. The spillway bays are air inflated rubber dams which are computer controlled to maintain a constant reservoir level. They can be deflated manually without electrical power. There are overhead lights installed at the dam. The procedures for contacting the proper personnel would be the same as those given in sections "Failure is Imminent or Has Occurred" or "Potentially Hazardous Situation Is Developing".

D. Response During Periods of Adverse Weather

No additional actions can be taken to respond to an emergency situation or failure at the dam during inclement weather, other than those taken during clear weather. The response time will be longer because of the additional time and travel involved in notification and response to an emergency during adverse weather. Travel time from Toston to Broadwater Dam is about 15 minutes during good weather. During periods of heavy snowfall, the access road to the powerhouse is plowed by the Broadwater County Road Crew.

Access roads to Broadwater Dam and the surrounding area are shown in Appendix F, Figures 1 through 4, pages F-3 through F-6. Should the main roads become impassable, secondary access to the dam is by

a road at the canal crossing, which goes over rough terrain and requires a four-wheel drive vehicle. Figure 4 in Appendix F is a project map that shows the Broadwater-Missouri Project in relation to other water projects downstream.

Instrumentation and surveillance systems are installed on the dam. Even when the dam is unmanned, dam failure would be detected during adverse weather by a low reservoir alarm. If an adverse condition is found, then the notification would follow the procedures in the sections called "Failure is Imminent or Has Occurred" or "Potentially Hazardous Situation Is Developing".

E. Availability and Use of Alternative Systems of Communication

Communication for the initial warning will be by telephone or driving directly to the Sheriff's Office. Once the initial warning is given, the Broadwater County Sheriff's Office can use its radio communication system. DES also has a radio communication system. The Sheriff's and DES's systems do not operate on the same frequency, but the two systems could be used concurrently through the sheriff's dispatch operator.

F. Emergency Supplies and Resources

1. Stockpiling of material and equipment for emergency use or repairs.

There are no emergency supplies stockpiled at the site. Sources of equipment for use during an emergency are listed below. We can visualize no case in which stockpiling materials or use of equipment could reduce the effect of a dam failure. The processes involved in the destruction of a dam are too powerful to be mitigated by the emergency use of machinery or

materials. However, the department will determine if equipment would be useful and will contact the contractors if necessary. The following area contractors have machinery which could be made available in an emergency:

<u>Name</u>	<u>Phone Number</u>
A & W Excavating . . . . .	227-6806
Broadwater County Shop . . . . .	266-3429
Highway Department Maintenance Shop (Townsend). . .	266-5571
Norman Excavating . . . . .	227-6826
Benson Excavation, Inc. . . . .	443-4760
Greenway, Inc.. . . . .	442-5500
Hall Earth Moving . . . . .	443-2245
Helena Sand & Gravel Co. . . . .	442-1185
Highway Department Maintenance Shop (Helena). . .	444-6155
Ingram-Clevenger . . . . .	442-5102
Jim Stout Excavation . . . . .	443-7593
Magille & Son . . . . .	442-5283
Maronick Construction Co. . . . .	227-5821

2. Coordination of Flows

Broadwater-Missouri Dam is a diversion dam on the Missouri River. Therefore, runoff forecasts are needed to operate the dam and anticipate any problems that may arise as a result of the high runoff. The Project Section Supervisor, Mel McBeath, phone (444-6646) is responsible for communicating with the National Weather Service (453-2081) to obtain runoff forecasts.

As discussed in paragraph C, the spillway bay rubber dams are computer controlled to maintain a constant reservoir level. If the level increases, an alarm will be automatically sent to the Plant Operator at a remote location. The Plant Operator can lower the rubber dams manually.

There are some reservoirs upstream of the dam that regulate stream flows.

The dam is an overflow diversion dam; therefore, there is very limited control over the river flows downstream of the dam.

3. Alternative sources of power for spillway gate operation and other emergency uses.

The dam is automatically operated. A 100-kv line, a 12-kv line and a battery bank provide electrical power to the operation system. The system will switch automatically between alternate power supplies.

G. Other Concerns and Actions

None

## V. APPENDICES

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APPENDIX A

DESCRIPTION OF BROADWATER-MISSOURI DAM

## APPENDIX A

### DESCRIPTION OF BROADWATER-MISSOURI DAM

Broadwater-Missouri Dam is located in Broadwater County about five miles south of Toston, Montana, on the Missouri River (see Appendix F, figures 1 through 4). The dam is owned and operated by the Montana Department of Natural Resources and Conservation (DNRC).

The concrete gravity dam was finished in 1940. It is 40 feet high to the top of the gravity overflow section, and 50 feet high to the top of the retaining wall. The dam is 705 feet wide, with a spillway capacity of 50,000 cubic feet per second (cfs). A powerhouse was constructed on the left (looking downstream) bank of the river through the dam. A 10 megawatt turbine-generator unit was installed in the powerhouse. Power was first generated in July 1989.

Water from the reservoir is used for irrigation. Water is delivered to purchasers through a canal system that is owned by DNRC. The Main Canal is 1.5 miles long and has a capacity of 342 cfs; the West Canal is 12.4 miles long and has a capacity of 90 cfs; and the East Canal is 34.3 miles long and has a capacity of 262 cfs. An 84-inch diameter steel pipe flume, 667 feet long, crosses the Missouri River to the East Canal.

The areas upstream and downstream of the dam are similar. The river is in a narrow, deep valley both upstream and downstream. The hills are fairly steep and rock-covered; an occasional rock outcropping can be seen. The valley

broadens out about five miles downstream. The Montana Rail Link railroad follows the river on the right bank (looking downstream). A gold mine and the U.S. Bureau of Reclamation Crow Creek Irrigation pumping plant are on the left bank (looking downstream) upstream of the dam. The irrigation canal follows the river on the left bank from the dam until it gets to a division structure. A steel pipe flume carries water across the river to a canal on the right bank, and some water remains in a canal that follows the left bank.



APPENDIX B  
BROADWATER-MISSOURI POWER PROJECT  
DAM-BREAK ANALYSIS

## APPENDIX B

### BROADWATER-MISSOURI POWER PROJECT

#### DAM-BREAK ANALYSIS

A dam-break analysis was conducted to assess the downstream effect of the flood waves resulting from a hypothetical failure of the Broadwater-Missouri (Toston) Dam. Three dam collapse scenarios were considered: (1) during the probable maximum flood (PMF) (495,000 cfs), (2) during the project maximum flood (79,000 cfs), and (3) during the maximum power generation flow of the project (6,000 cfs). Since the tailwater at Broadwater-Missouri Dam during the PMF would reach about the same level as the headwater, the effect due to dam-break waves would be minimal. Therefore, no further analysis was performed. For the remaining two scenarios studied, effect of dam-break waves, in terms of maximum elevation, maximum flow, travel time, and maximum velocity, were assessed for fourteen (14) downstream sections. Eight of these cross sections are shown in Table B-2 on page B-4.

It is important to examine the suitability and applicability of each mathematical model for dam-break wave calculations. Many mathematical models are available to calculate the dam-break waves. A summary of the various models can be found from the proceedings of the Dam-Break Flood Routing Model Workshop organized by the U.S. Water Resources Council, which were published by the National Technical Information Service of the U.S. Department of Commerce. For the case of Broadwater-Missouri Dam, the model developed by the U.S. National Weather Service (DAMBRK) was used (Ref. 4).

The breach assumptions and results are summarized in Tables B-1 and B-2 and in Figure B-1.

Table B-1

Breach Assumptions

Scenario I - Project Maximum Flood at 79,000 cfs

Breach Width = 375 ft.

Spillway Gates Fully Open

Time to Failure: 0.2 hours

Scenario II- Power Generation Operation at 6,000 cfs

Breach Width = 375 ft.

Spillway Gates Fully Closed

Time to Failure: 0.2 hours

**Conclusion**

The results shown in Table B-2 indicate that the dam-break flood wave created by dam failure during the project maximum flood (79,000 cfs) will attenuate from about 11.0 feet to about 1.1 feet within the first five miles below the dam. During the maximum power generation flow (6,000 cfs), the dam-break flood wave will attenuate from 30.2 feet to about 7.6 feet within the first five miles

TABLE B-2  
DAM-BREAK ANALYSIS RESULTS

Scenario I - Project Maximum Flood at 79,000 cfs

Cross Section	Distance From Dam (Miles)	Peak Discharge (cfs)	Wave Velocity (fps)	Travel Time		Wave Height (ft.)	Water Surface Elevation	
				Initial hrs.	Peak hrs.		Before Failure (ft.)	After Failure (ft.)
Dam	0	145,367	10.97	0.20	0.55	11.01	3946.90	3957.91
A	2.1	118,799	10.97	0.54	0.98	3.12	3934.18	3937.30
B	5.4	107,010	2.05	0.92	1.57	1.11	3912.01	3913.12
C	11.3	101,478	5.88	0.98	3.31	0.85	3875.30	3876.15
D	14.9	100,324	4.69	2.00	4.77	1.28	3847.72	3849.00
D	17.4	99,729	6.84	2.53	5.29	1.03	3837.29	3838.32
D	19.9	99,519	5.56	2.91	5.93	0.91	3816.68	3817.59
G	22.3	98,907	2.66	3.60	7.12	0.71	3805.92	3806.63
H	23.5	98,573	2.23	3.97	9.64	0.44	3803.68	3804.12

Scenario II - Power Generation Operation at 6,000 cfs

Cross Section	Distance From Dam (Miles)	Peak Discharge (cfs)	Wave Velocity (fps)	Travel Time		Wave Height (ft.)	Water Surface Elevation	
				Initial hrs.	Peak hrs.		Before Failure (ft.)	After Failure (ft.)
Dam	0	167,530	12.37	0.00	0.01	30.25	3922.35	3952.60
A	2.1	71,890	10.93	0.08	0.47	15.08	3916.15	3931.23
B	5.4	43,571	5.85	0.54	1.23	7.60	3899.21	3906.81
D	11.3	26,310	4.62	1.83	4.04	3.34	3868.39	3871.73
D	14.9	24,566	2.85	3.26	5.65	2.78	3839.17	3841.95
D	17.4	22,585	4.49	4.10	6.74	3.12	3828.59	3831.69
D	19.9	21,891	3.67	4.88	7.77	2.77	3808.99	3811.76
D	22.3	20,435	1.62	6.36	9.30	1.48	3800.44	3801.92
H	23.5	19,029	1.23	7.00	10.29	1.07	3798.46	3799.53

Cross Section	Description
A	First house downstream of dam
B	Town of Toston
C	Houses between river and railroad
D	Cemetery
E	Grain bins
F	Townsend
G	Canyon Ferry Reservoir delta
H	Canyon Ferry Reservoir

Revised 6/1/91

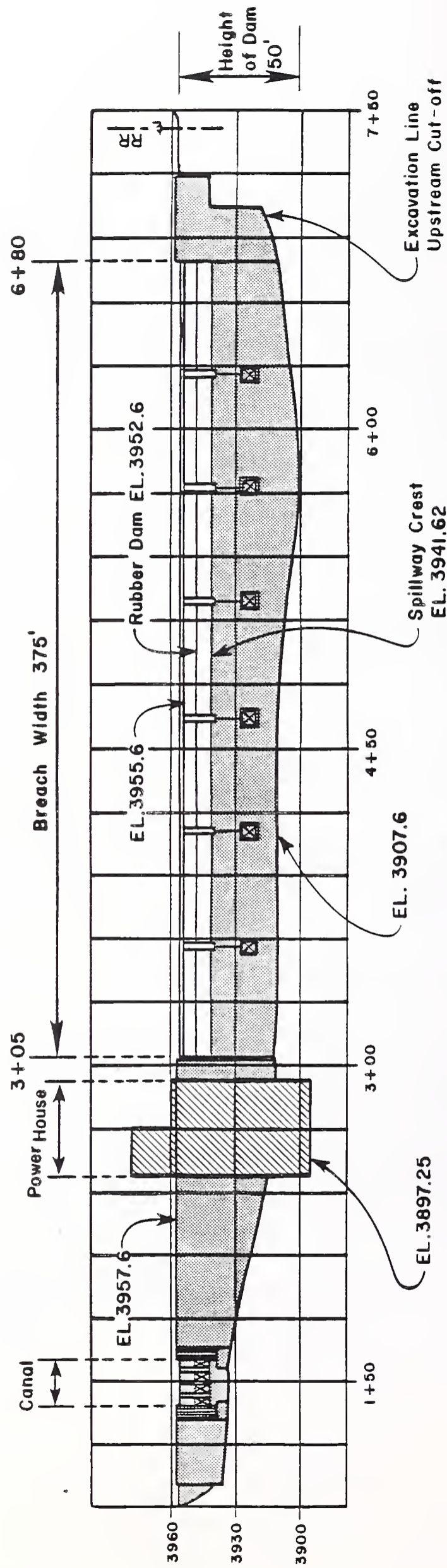
below the dam. At that point the flood wave from both flood conditions varies from 7.6 feet to 0.4 feet until it reaches Canyon Ferry Reservoir. The dam-break flood wave created by dam failure during the project maximum flood and during the maximum power generation flow will have peak discharges at the dam of 145,367 cfs and 167,530 cfs, which will cause flooding as indicated on Figures C-1 through C-6, pages C-3 through C-13, Broadwater-Missouri Dam Flood Inundation Maps.

The failure of Broadwater-Missouri Dam will raise the water surface at the head end of Canyon Ferry Reservoir by about 1.1 feet. This will dissipate to near zero by the time that the wave reaches the dam, 25 miles downstream.

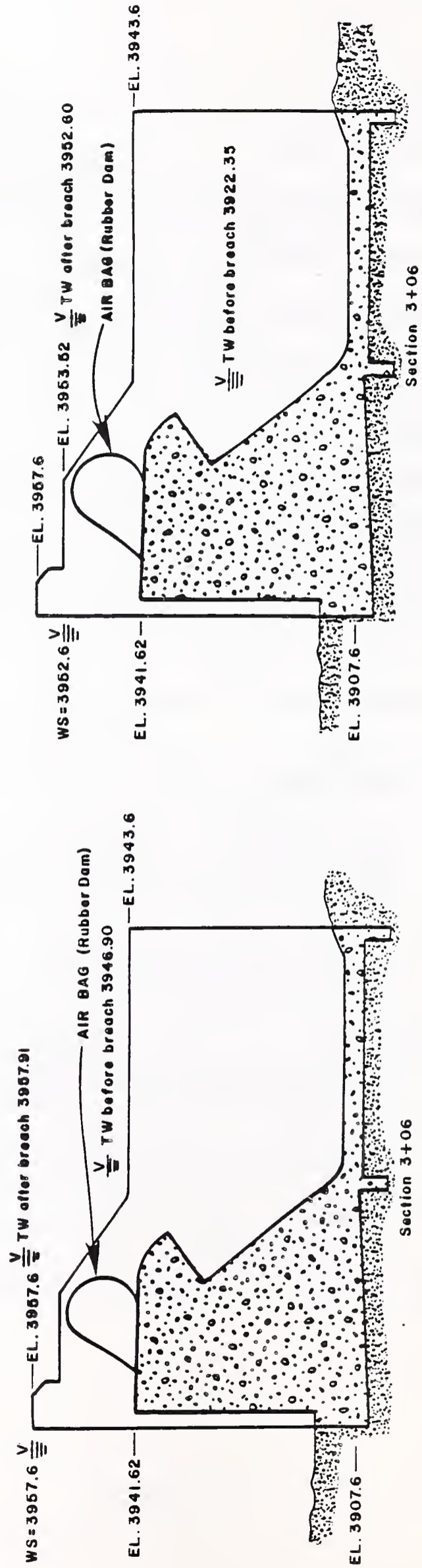
## References

1. Stoker, J. J. 1957. "Water Waves." Inter-Science Pub., New York.
2. Su, S. T. 1977. "Unsteady Flow Analysis of Dam-Break Waves." Proceedings of Dam-Break Flood Routing Model Workshop, Water Resources Council, NTIS P8-275 437.
3. Su, S. T. and A. H. Barnes. 1970. "Geometric and Frictional Effects of Sudden Releases." Journal of Hydraulic Division, American Society of Civil Engineers, HY11. Nov.
4. Fread, D.L., 1984, DAMBRK: the National Weather Service Dam-Break Flood Forecasting Model. National Weather Service.
5. Tudor Engineering Company. 1982. Broadwater Power Project. License Application to Federal Energy Regulatory Commission.
6. Rouse, H. 1950. Engineering Hydraulics. John Wiley and Sons, Inc. New York.

# FIGURE B-1 BREACH PARAMETERS



## ELEVATION OF THE DAM SHOWING BREACH PARAMETERS NO SCALE



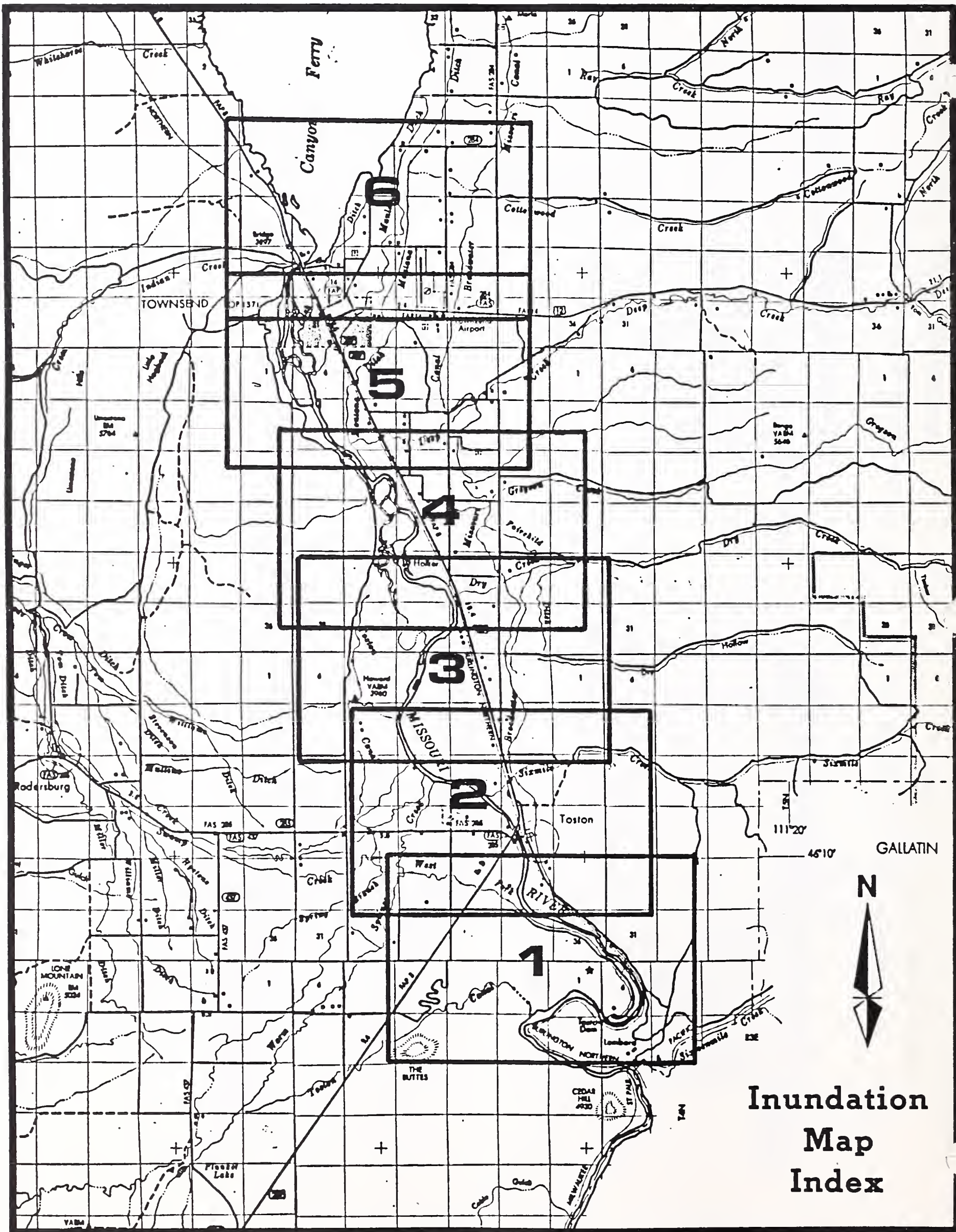
PROJECT MAXIMUM FLOOD AT 79,000 cfs

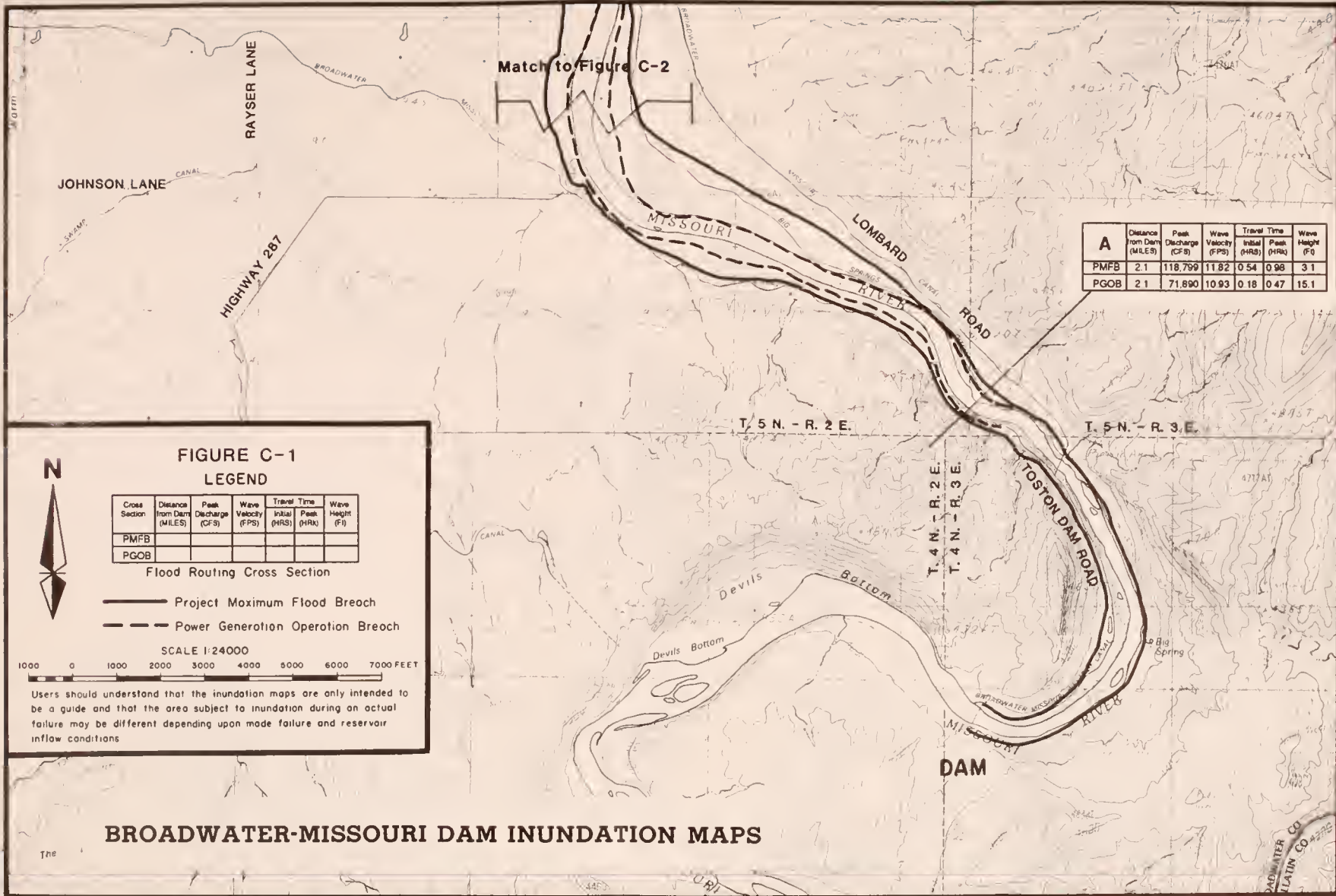
POWER GENERATION OPERATION AT 6,000 cfs

WATER SURFACE ELEVATIONS

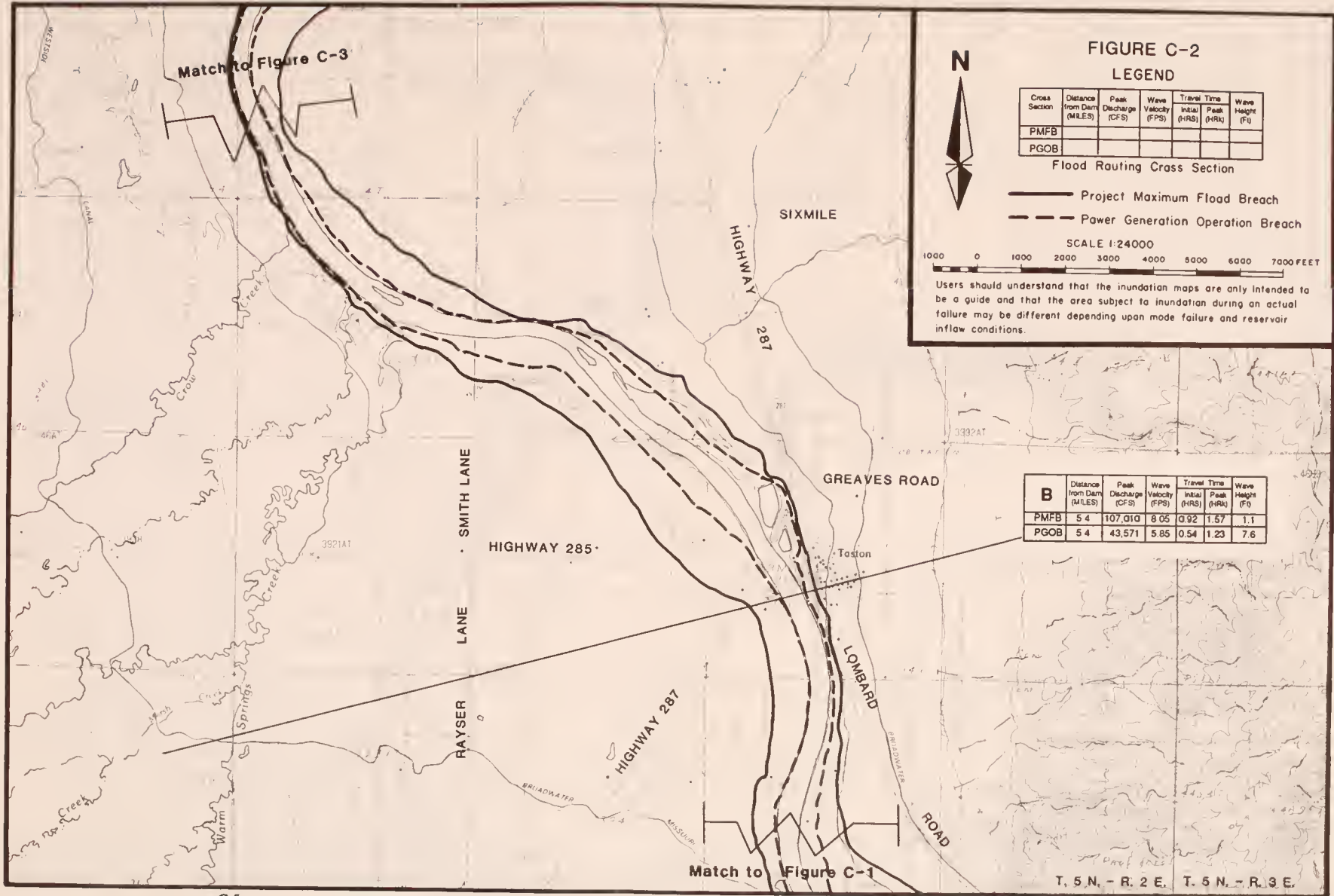
WATER SURFACE ELEVATIONS

APPENDIX C  
FLOOD INUNDATION MAPS

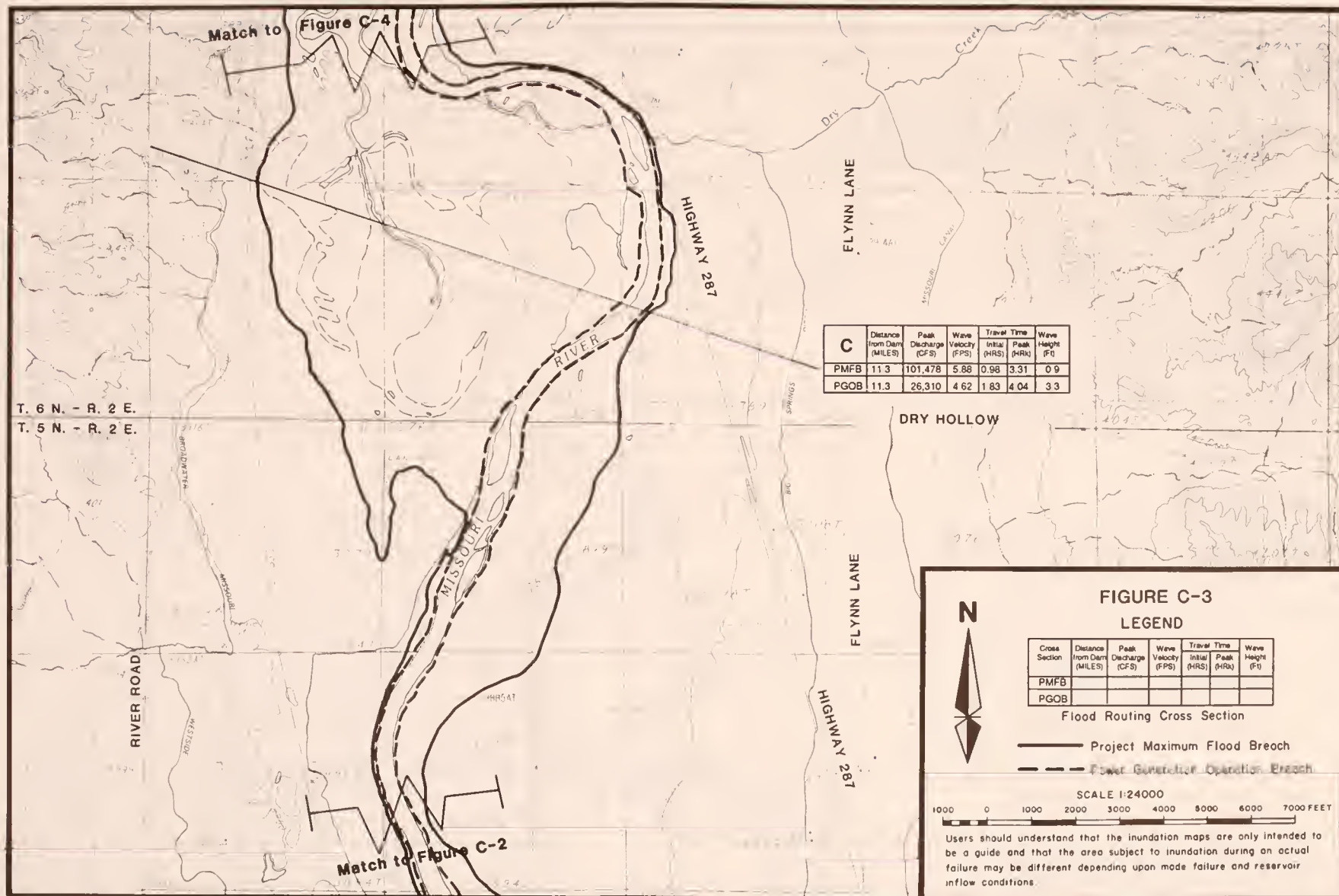




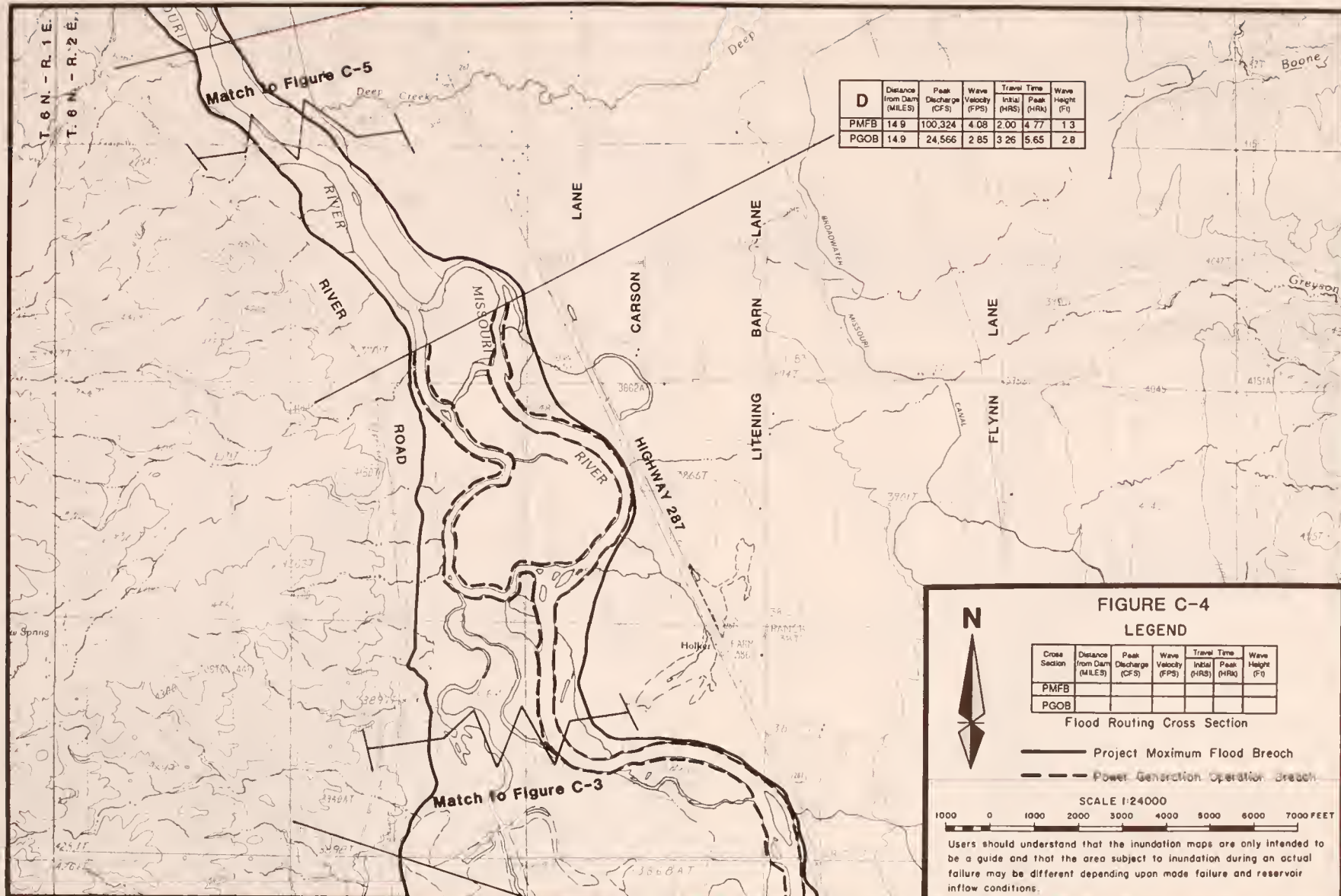












**FIGURE C-4**

**LEGEND**

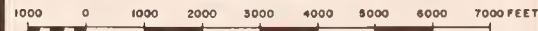
Cross Section	Distance from Dam (MILES)	Peak Discharge (CFS)	Wave Velocity (FPS)	Travel Time Initial (HRS)	Travel Time Peak (HRS)	Wave Height (Ft)
PMFB						
PGOB						

Flood Routing Cross Section

— Project Maximum Flood Breach

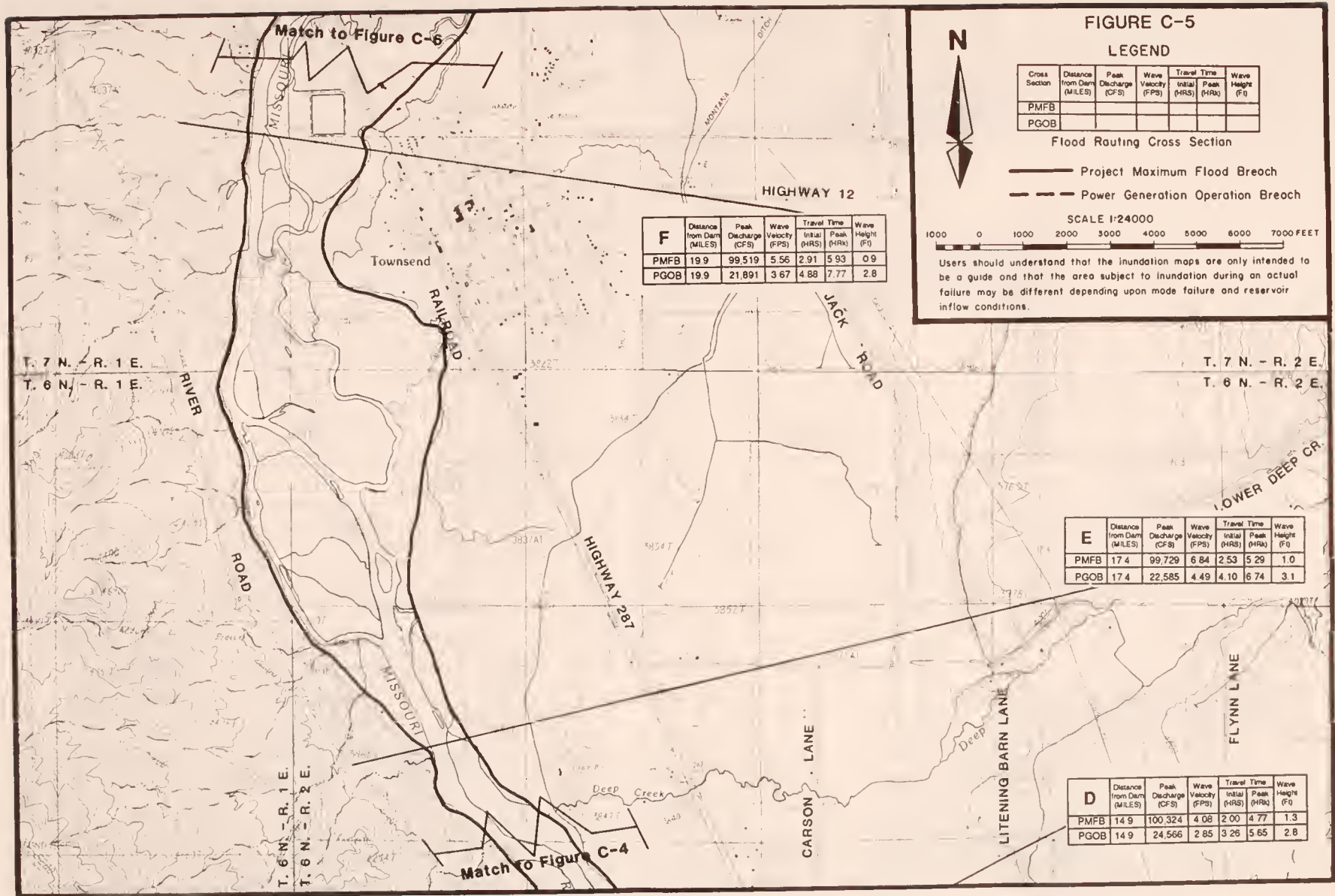
- - - Power Generation Operation Breach

SCALE 1:24000

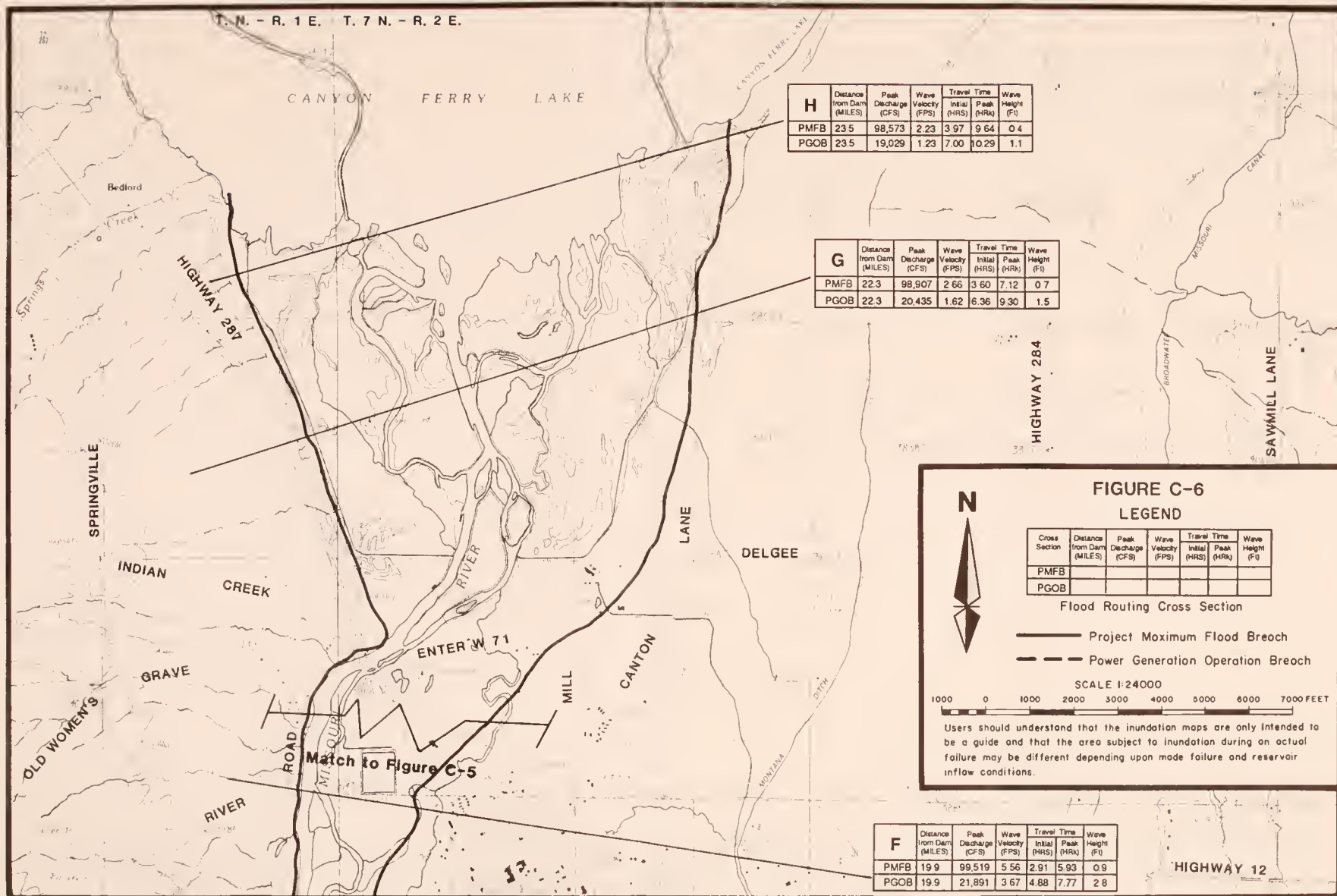


Users should understand that the inundation maps are only intended to be a guide and that the area subject to inundation during an actual failure may be different depending upon mode failure and reservoir inflow conditions.











APPENDIX D

PLANS FOR POSTING THE EAP, TRAINING, TESTING, AND ANNUAL REVIEW

## APPENDIX D

### Plans for Posting the EAP, Training, Testing, and Annual Review

#### 1. Posting the EAP

A copy of the notification flowcharts for both a "failure is imminent or has occurred" and a "potentially hazardous situation is developing" scenarios shall be posted at the following locations:

1. Broadwater Power Project Control Room
2. Engineering Bureau Office - Helena
3. Plant Operator's Home
4. Broadwater County DES Coordinator - Townsend
5. Broadwater County Sheriff's Office - Townsend
6. Federal Energy Regulatory Commission - Portland Office
7. Broadwater-Missouri Water Users Association Directors
8. Department of Natural Resources and Conservation

#### Library

9. State Library
10. State Disaster and Emergency Services - Helena
11. Ditch Rider
12. Montana Power Company - Butte

2. Annual training of project operators and other responsible personnel

Training will be provided on a yearly basis for all Project Personnel involved with the EAP at the dam. The Broadwater county sheriff and the DES coordinator, and the state DES personnel will be invited to participate in the training session. This training will include, but is not limited to:

- a. A general discussion on how to respond properly to an emergency situation.
- b. Procedures to follow throughout an emergency.
- c. Basic communications skills - how and when to use them. Samples of typical communications during implementation of the EAP warning flowchart will be given to all personnel during this training.
- d. The flowcharts will be reviewed for each failure scenario.

This training will be held once every 12 months at a time and date to be determined by the EAP coordinator and will be held in conjunction with the annual review of the EAP.

3. Annual Review.

A comprehensive review of the adequacy of the EAP will be conducted each year. This review is to verify phone numbers, names, position titles, etc. A determination of any new developments or other changes downstream or elsewhere will be made

to determine whether any revisions to the current EAP are necessary. Revisions will be made to the current EAP as necessary. Revisions will be made immediately after any changes are discovered and updated pages will be mailed to all holders of the EAP. A statement will be furnished to the Regional Director prior to December 31, which states that the EAP has been thoroughly reviewed and includes the date it was last tested. Attached to this statement will be any updated pages with the changes highlighted, or a separate statement that no revisions or updates were needed.

4. Test of the state of readiness.

A. Review of annual test procedure.

Review of the annual test procedure will be summarized and documented by the Broadwater County DES coordinator, the Engineering Bureau, and the Broadwater County Sheriff.

B. Annual test procedure.

The Engineering Bureau will coordinate the test with the Broadwater County DES coordinator. The DES coordinator will give a message to the project operator. The message will describe the emergency situation. The project operator will drive to the dam, read the message, and then proceed with the test. The Plant Operator will decide which Notification Flowchart is appropriate for the message received, and follow the notification procedure for that particular condition. The test will stop once the call

has been received by State DES and the Engineering Bureau.

All of the alarm systems will be tested at this time, to make sure that they are operational. Repairs will be made to the system if necessary.

C. Action to be taken.

If the tests indicate that the EAP needs revision, the EAP will be revised by the Engineering Bureau when the yearly revision is done.

D. Who determines if test is successful.

The local DES coordinator will submit a critique of the test to the Engineering Bureau. The Engineering Bureau will determine if the test is successful based upon recommendations received from the local DES coordinator.

E. Submitting test results.

The Engineering Bureau will submit the test results to the Regional Director of FERC within 30 days of the test.

F. Checkpoints.

The following checkpoints will be used to help determine if the test is successful according to FERC requirements.

1. Time project operator becomes aware of the problem at the dam
2. Time it takes project operator to make first call, and any subsequent calls to the other personnel listed on the Notification Flowcharts.

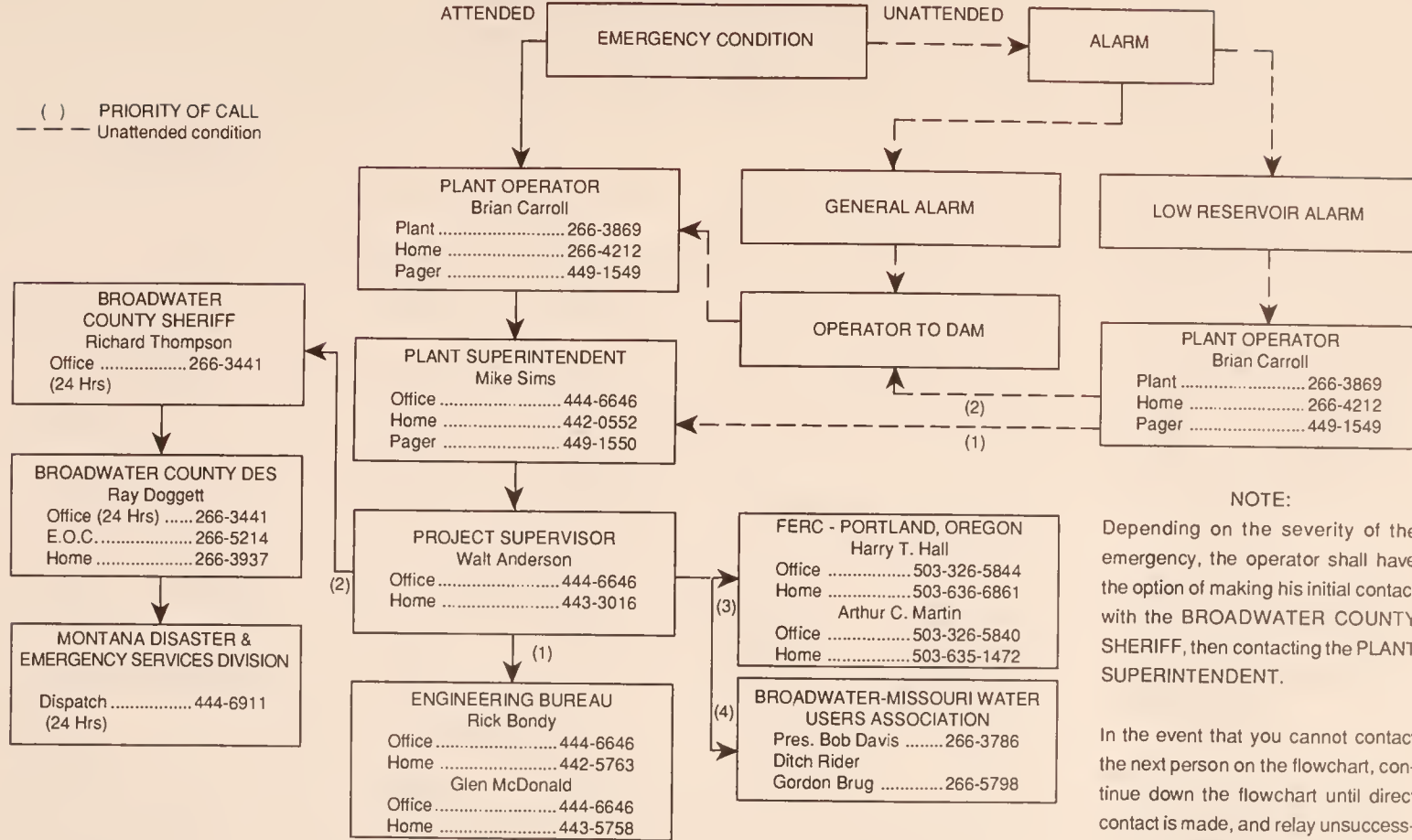
APPENDIX E  
DOCUMENTATION

## (

## (

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# **B. POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING** **NOTIFICATION FLOWCHART** **BROADWATER-MISSOURI DAM**



## **NOTE:**

Depending on the severity of the emergency, the operator shall have the option of making his initial contact with the BROADWATER COUNTY SHERIFF, then contacting the PLANT SUPERINTENDENT.

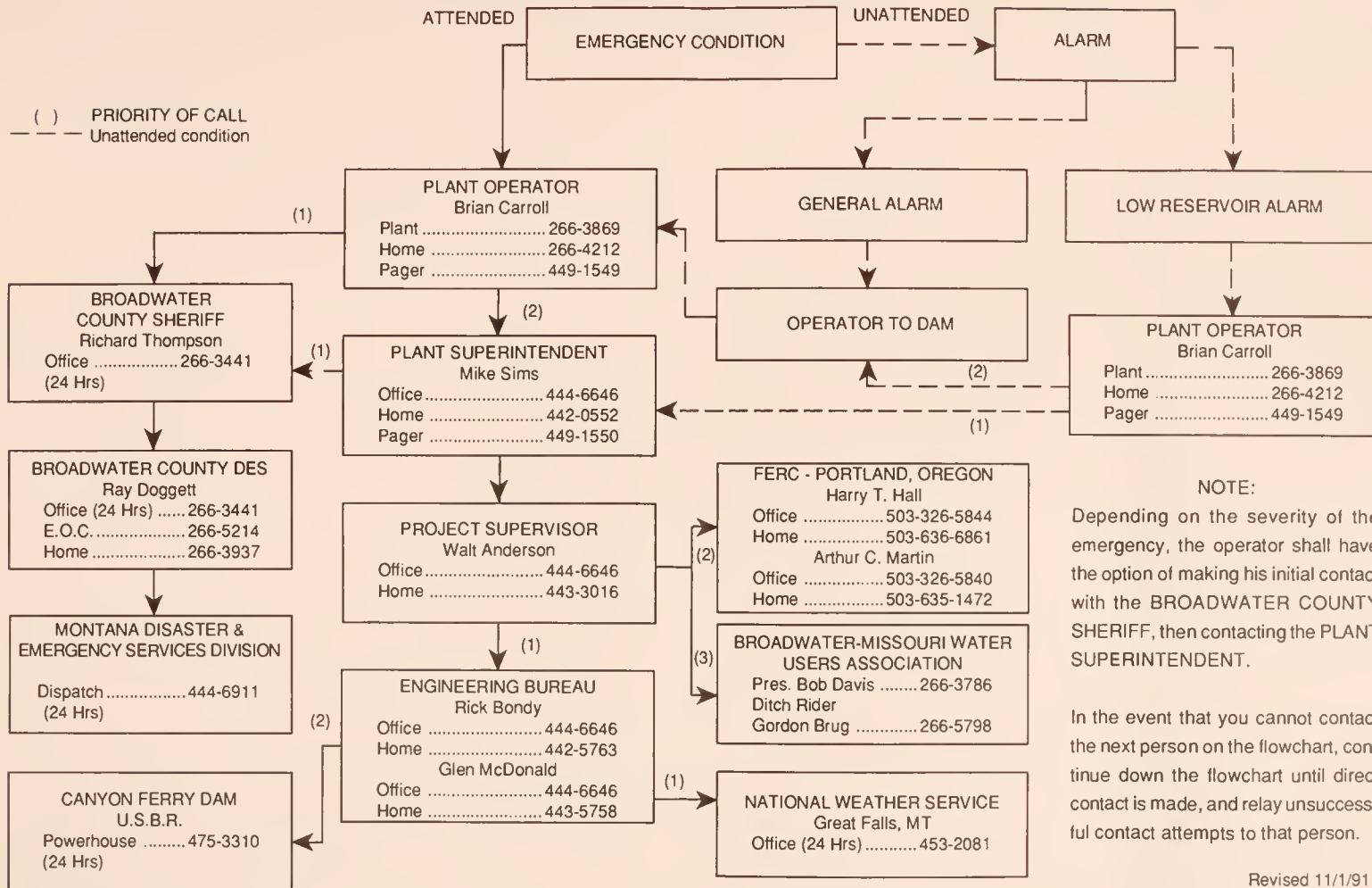
In the event that you cannot contact the next person on the flowchart, continue down the flowchart until direct contact is made, and relay unsuccessful contact attempts to that person.



# I. NOTIFICATION FLOWCHARTS

## A. FAILURE IS IMMINENT OR HAS OCCURRED

### NOTIFICATION FLOWCHART BROADWATER-MISSOURI DAM





APPENDIX F  
LOCATION MAPS





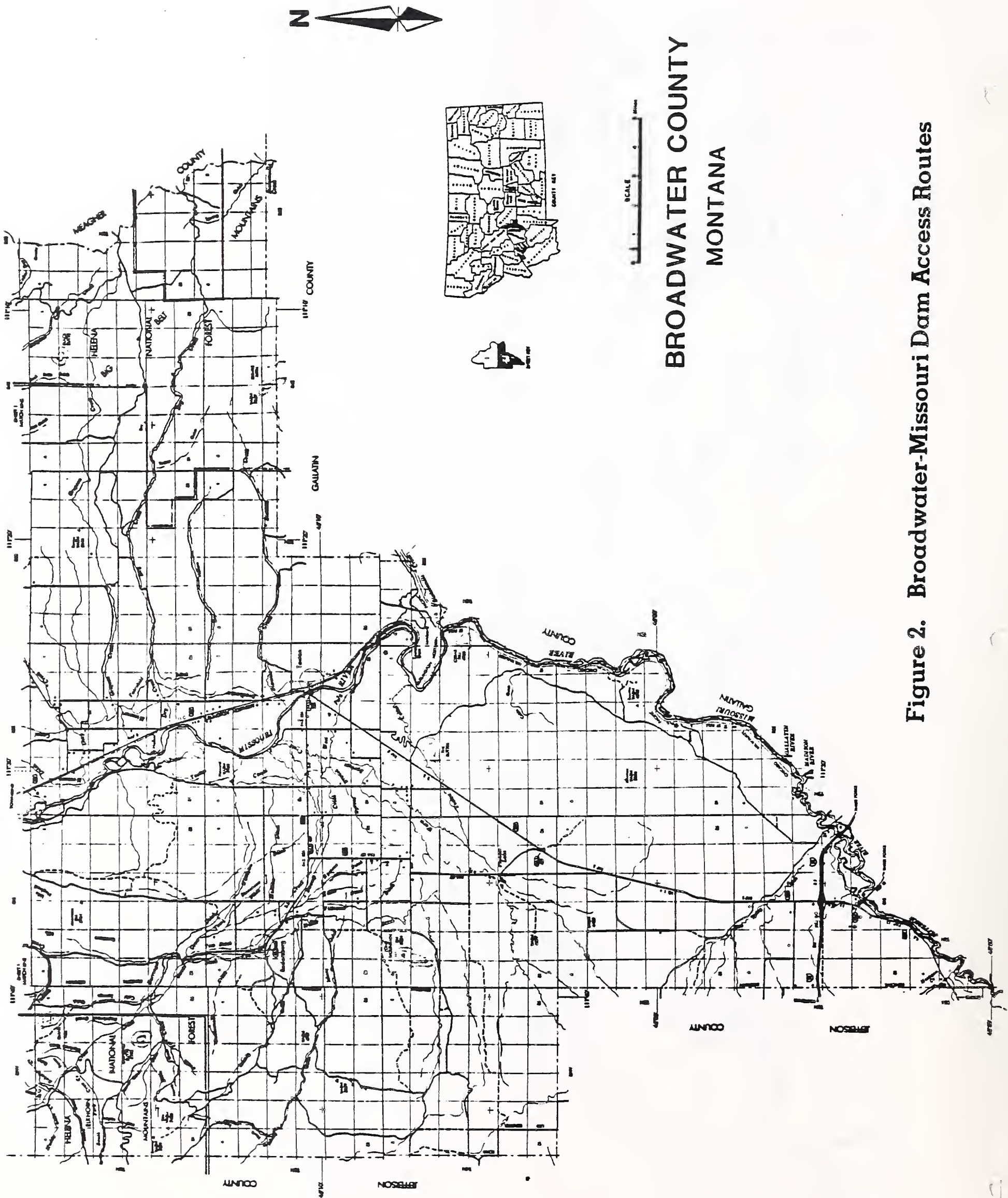
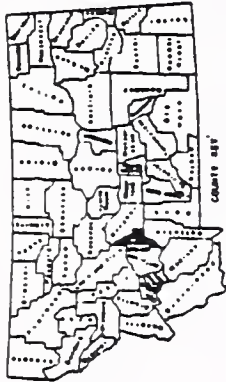


Figure 2. Broadwater-Missouri Dam Access Routes



# BROADWATER COUNTY MONTANA

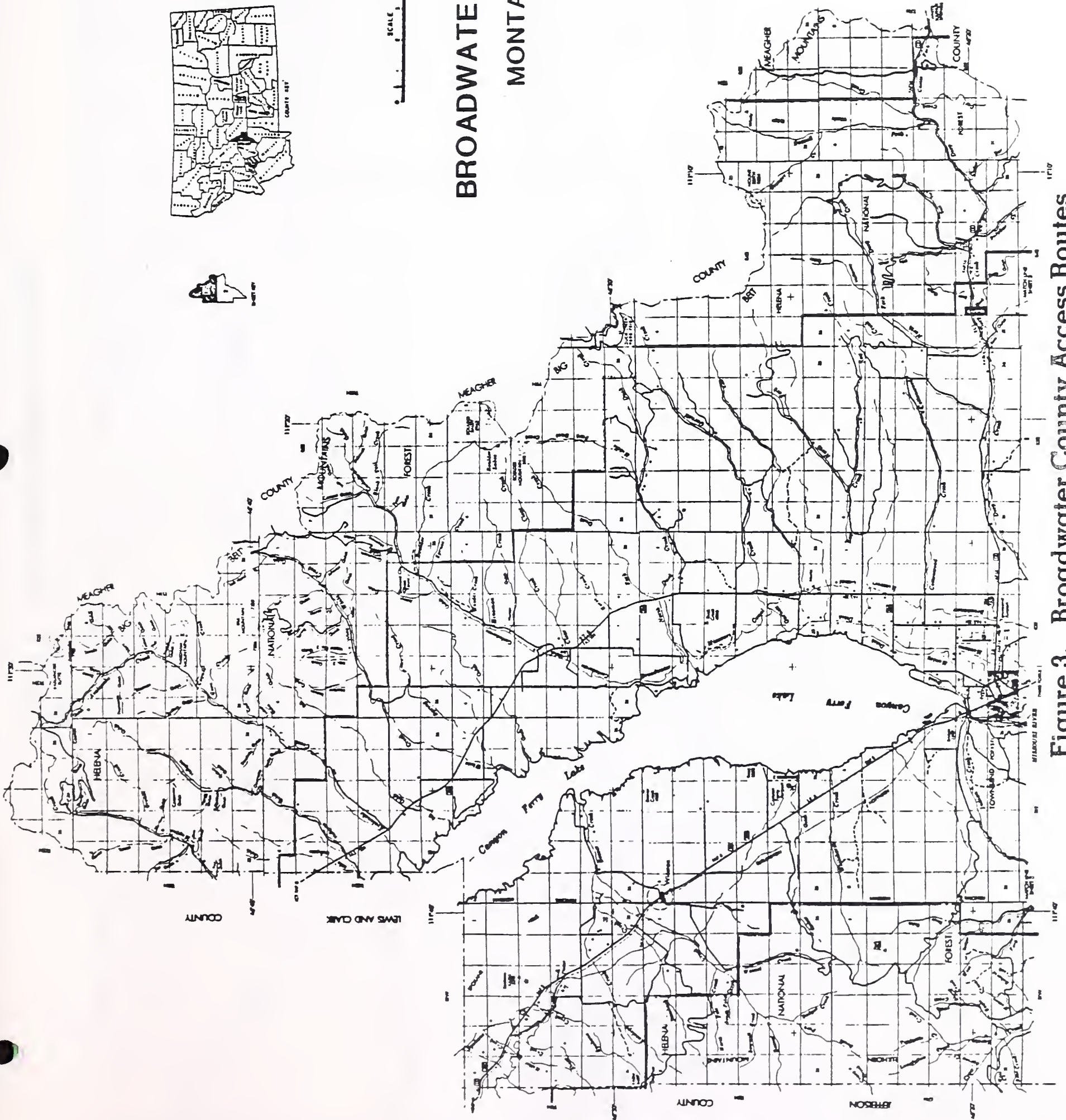


Figure 3. Broadwater County Access Routes

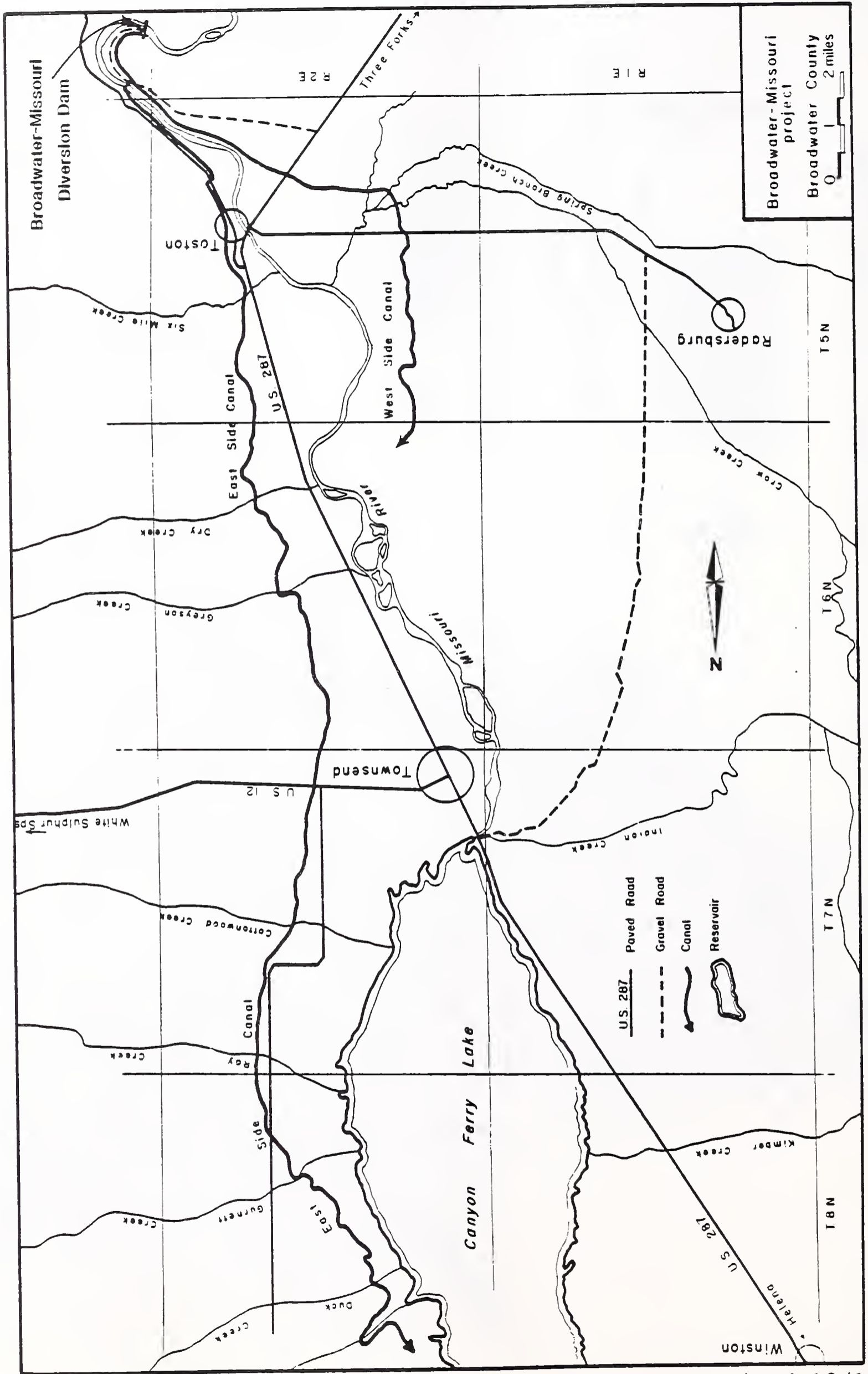


Figure 4. Broadwater-Missouri Project

APPENDIX G

TELEPHONE DIRECTORY

APPENDIX G  
TELEPHONE DIRECTORY

The telephone numbers are listed in order of priority.

1. SHERIFF

Broadwater County. . . . . 266-3441

2. DISASTER AND EMERGENCY SERVICES

Broadwater County. . . . . Business 266-3441

Ray Doggett . . . . . EOC 266-5214

Home 266-3937

Montana Disaster and Emergency Services

Division (Helena) . . . . . 444-6911

3. MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (DNRC)

Power Plant at the dam . . . . . 266-3869

Auxiliary number (FAX) 266-3817

Chatter Box 266-4454

Engineering Bureau . . . . . Office 444-6646

Bureau Chief: Richard Bondy. . . . . Home 442-5763

Supervisor, Walt Anderson . . . . . Home 443-3016

Plant Superintendent, Mike Sims . . . . . Home 442-0552

Pager 449-1550

Plant Operator, Brian Carroll . . . . . Home 266-4212

Pager 449-1549

Plant Operator, Jim Beck. . . . . Home 266-3026

Supervisor, Project Rehabilitation Section:

Glen McDonald . . . . . Home 443-5758  
Dam Safety Engineer: Arthur Taylor . Home 443-0315  
Civil Engineer: Robert Clark . . . . Home 449-3568  
Civil Engineer: John Sanders . . . . Home 442-9739

Supervisor, Project Section:

Mel McBeath . . . . . Home 933-5556  
Water Resources Division . . . . . Office 444-6601  
Administrator: Gary Fritz . . . . . Home 443-3631  
Assistant Administrator: Robin Harper . Home 227-5982  
Assistant Administrator: Laurence Siroky Home 442-2806  
Civil Engineer: Mike Oelrich . . . . Home 449-5668  
Civil Engineer: Gary Fischer . . . . Home 442-8818  
Department Director . . . . . Office 444-6699  
Karen Barclay . . . . . Home 449-7174  
Deputy Director: Wayne Wetzel . . . . . Home 227-6419  
Information Officer: James Bond . . . . . Office 444-6743

4. DITCH RIDER

Gordon Brug . . . . . Home 266-5798

5. NATIONAL WEATHER SERVICE

Helena . . . . . 449-5204  
Great Falls . . . . . 453-2081

6. Canyon Ferry

Power Plant Operator (24 hrs.) . . . . . 475-3310

7. BROADWATER-MISSOURI WATER USERS ASSOCIATION

President: Bob Davis . . . . . 266-3786

Vice President: Bob Hensley . . . . . 266-3633

Directors:

Jed Stanfill. . . . . 266-3709

Don Shearer . . . . . 266-3785

Pat Antonick. . . . . 266-3059

Dave Rowland. . . . . 266-4447

Keith Kirscher. . . . . 266-3785

8. GOVERNOR'S OFFICE . . . . . 444-3111

Citizen's Advocate . . . . . 1-800-332-2272

9. FEDERAL ENERGY REGULATORY COMMISSION

Portland Regional Office

Arthur C. Martin . . . . . Office 503-326-5840

Home 503-635-1472

Harry T. Hall . . . . . Office 503-326-5844

Home 503-636-6861

## 10. SOURCES OF AIRCRAFT

Name	Phone Numbers
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### GOVERNMENT AGENCIES

Department of	Office . . . . .	444-2074
State Lands	Hangar . . . . .	444-4766
Rick Burger . . . . .	Home	442-9531
Summer Fire Dispatch . . . . .		444-4242
Tim Pfahler . . . . .	Home	458-5136

### PRIVATE FLYING SERVICES

#### Helena

Corporate Air	Office . . . . .	443-4543
Corporation		
Morrison's Flying Service	Office . . . . .	442-2190
	Jeff Morrison. . . Home	442-8547

#### Billings

Billings Deaconess Hospital	Office . . . . .	657-4000
		1-800-325-1774
Billings Flying Service	Office . . . . .	248-1741
Corporate Air	Office . . . . .	248-1541
Lynch Flying Service, Inc.	Office . . . . .	252-0508
Saint Vincent Hospital and	Office. . . . .	1-800-538-4357
Health Center		

Bozeman

Central Helicopters, Inc.

Office . . . . . 586-9185

